THE CATHOLIC UNIVERSITY OF AMERICA

The Effect of a Multi-faceted Educational Intervention upon Staff Nurses’ Knowledge Related to Adherence to a No-Lift Policy

AN EVIDENCE-BASED PRACTICE PROJECT

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For the Degree of
Doctor of Nursing Practice

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By
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Washington, D.C.

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The Effect of a Multi-faceted Educational Intervention upon Staff Nurses’ Knowledge Related to Adherence to a No-Lift Policy

Background: For several decades, work-related injuries, most notably low back injuries, among nursing staff have been associated with substantial retention issues and turnover within the workforce as well as with elevated costs of care delivery because of lost wages, time off, and injury-related medical costs. Establishing a culture of safety for safe patient handling and mobility (SPHM) using newer mechanical technologies and zero or no-lift practices has been advocated as one essential approach to lowering injury rates in nurses. Minimal lift equipment (MLE) has been shown to reduce injury rates in nurses. However, MLE must be used in combination with other interventions, such as train-the-trainer, nurse education, use of nurse champions, and hospital no-lift policies to be successfully utilized and implemented in nursing practice.

Purpose: To develop, implement, and evaluate an evidence-based, multifaceted educational approach to address the knowledge of nursing staff regarding SMHP and zero lift policies.

Design: A pre-test/post-test design allowed the researcher to compare knowledge before the multifaceted preventive intervention and 6 weeks after the implementation of the multifaceted intervention to prevent back pain and injuries.

Methods: A total of 32 nurses participated. Prior to the main analyses, the data were assessed for large portions of missing data (>50%). Fourteen participants did not complete the post-test questionnaire. As such, these participants were removed from the dataset, resulting in a final sample of 18 participants who completed both the pre-test questionnaire and the post-test questionnaire. In order to assess the change in nurse’s general knowledge of zero-lift policies and
A dependent *t*-test was performed. The variables used in this analysis corresponded to the number of correct responses pre-test and the number of correct responses post-test. Prior to the analysis, the assumption of normality was assessed using a Kolmogorov-Smirnov (KS) test. The KS test was not significant (*p* = .200), indicating that normality can be assumed.

**Results:** The results of the dependent samples *t*-test were significant, *t*(17) = -3.94, *p* < .001. This indicates that there were significant differences between the number of correct responses pre-test and post-test. Examination of the means indicated that pre-test, there was an average of 6.44 correct responses out of a maximum of 12 (*SD* = 2.09). Post-test, there was an average of 9.28 (*SD* = 2.05) correct responses out of 12 possible correct answers.

**Conclusion:** The implementation of a multifaceted educational intervention improved the knowledge of nursing staff regarding SMHP and zero lift policies. Given the importance of retaining qualified nurses, workplace safety, and the wellbeing of staff nurses, the successful implementation of this project is an important step in improving workplace safety and should perhaps be mandatory upon new hire orientation.
This Evidence Based Project by Lisa Berge fulfills the dissertation requirements for the doctoral degree in Doctor of Nursing Practice approved by Nalini Jairath, PhD, RN, as director, and by Sandra O’Brien, PhD, RN, and Vickie Fieler, PhD, RN as readers.

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Sandra O’Brien, PhD, RN
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TABLE OF CONTENTS

CHAPTER 1: NATURE AND SCOPE OF THE PROJECT ................................................................. 1
  Introduction ....................................................................................................................... 1
  Project Objectives ......................................................................................................... 4

CHAPTER 2: SYNTHESIS AND ANALYSIS OF SUPPORTING AND RELATED LITERATURE ................................................................................................................................ 6
  Satisfaction with Minimal Lift Equipment .................................................................. 6
  Zero Lift Programs ....................................................................................................... 7
  Multifaceted and Multidisciplinary Preventive Interventions ...................................... 8
  The Role of Education ................................................................................................. 14
  Conclusion .................................................................................................................... 15

CHAPTER 3: PROJECT METHODS .......................................................................................... 17
  Clinical Practice Problem Description ....................................................................... 19
    Phase I: Preparation—Getting Ready by Defining a Priority Need ....................... 20
    Phase II: Validation—Assessing the Body of Evidence by Systematically Critiquing Each Study in a Literature Review ................................................................. 21
    Phase III: Comparative Evaluation and Decision Making—Determining the Use of the Evidence ........................................................................................................ 21
    Phase IV: Translation and Application—Converting-Translating the Results and Implementing the Evidence-Based Change Plan ........................................... 26
  Methods and Procedures ............................................................................................. 26
Discussion..........................................................................................50
Limitations and Barriers.......................................................................51
Sustainment Plan..................................................................................53
Implications for Nursing.................................................................54
Recommendations............................................................................55
Conclusions......................................................................................57
REFERENCES ..................................................................................58
# List of Tables and Figures

## FIGURES

Figure 1 Timeline for the Effect of a Multi-faceted Educational Intervention ...............18

## TABLES

Table 1 SWOT Analysis..............................................................................................................25
Table 2 EBP Project Budget......................................................................................................39
Table 3 Means and Standard Deviations for Continuous Demographic Variables...........42
Table 4 Frequencies and Percentages for Nominal Demographic Data.............................42
Table 5 Results of the Dependent Sample t-Test....................................................................47
List of Appendices

Appendix A  Leadership Presentation.................................................................64
Appendix B  Education Booklet..............................................................................69
Appendix C  Questionnaire....................................................................................81
Appendix D  Nursing Flyer Invitation to Participate...............................................90
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANA</td>
<td>American Nurses Association</td>
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<td>CNS</td>
<td>Clinical Nurse Specialist</td>
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<td>EBP</td>
<td>Evidence Based Practice</td>
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<td>Internal Review Board</td>
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<td>LBP</td>
<td>Low Back Pain</td>
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<td>MLE</td>
<td>Minimal Lift Equipment</td>
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<tr>
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<td>National Institute of Occupational Safety and Health</td>
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<td>OSHA</td>
<td>Occupational Safety and Health Administration</td>
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<td>RCT</td>
<td>Randomized Controlled Trial</td>
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<td>SPHM</td>
<td>Safe Patient Handling and Mobility</td>
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<tr>
<td>STEPs</td>
<td>Safe Transfer Every Person Succeeds Program</td>
</tr>
</tbody>
</table>
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CHAPTER 1: NATURE AND SCOPE OF THE PROJECT

Introduction

As the U.S. nursing workforce ages, patient acuity continues to increase, putting nurses at more risk for musculoskeletal injuries (Mayeda-Letourneay, 2014). For several decades, work-related injuries, most notably low back injuries, among nursing staff have been associated with substantial retention issues and turnover within the workforce as well as with elevated costs of care delivery because of lost wages, time off, and injury-related medical costs. The Bureau of Labor and Statistics showed that licensed nursing assistants (LNAs) are ranked first and registered nurses (RNs) fifth in the highest number of musculoskeletal injuries resulting in missed workdays (American Nurses Association [ANA], 2013). Musculoskeletal injuries in nurses are a result of continual manual lifting. During the past decade, researchers have determined that no safe way exists to manually lift a patient (Stevens, Rees, Lamb, & Dalsin, 2013). Thus, creation of a safer working environment for nurses is essential to reducing back pain and injuries across acute care, rehabilitation, and chronic care settings. Research supports the use of assistive technology to reduce injuries to workers, as well as reducing injuries in patients, while lowering cost attributable to workers’ compensation, lost productivity, and staff turnover (ANA, 2013).

Establishing a culture of safety for safe patient handling and mobility (SPHM) using newer mechanical technologies and zero or no-lift practices have been advocated as one essential approach to lowering injury rates in nurses. These practice changes require both administrative changes to policies, protocols, and available resources as well as behavioral changes by individual nursing staff. Given the importance of reducing back injuries among nursing staff, the American Nurses Association (ANA), introduced the Handle with Care campaign to reduce the
risk of employee injury associated with patient handling, thus changing the way health care is
delivered. The campaign initially focused on educating, advocating, and facilitating change from
a traditional manual lifting practice to emerging technologies that would lessen the physical
demands on nurses and ultimately reduce injuries (De Castro, 2006). In 2008, the ANA extended
the campaign with the ANA introducing an updated position statement along with actions and
policies to promote the elimination of manual patient handling (ANA, 2008). This paradigm shift
in nursing is based on a growing body of research and other databased evidence demonstrating
that manual handling was unsafe in almost every situation and documenting the effectiveness of
SPHM technology to lift, transfer, and reposition patients. The ANA (2013) also identified the
need to identify high-risk activities, such as force, repetition, and posture to maximize the
benefits of SPHM technology. Finally, the ANA issued a set of interprofessional standards for
SPHM to guide institutions (Kuehn, 2013). These standards served as a guide for multiple health
care professionals who provide care in diverse settings, including but not limited to nurses,
therapists, physicians, paramedics, technicians, technologists, aides, and unlicensed assistive
personnel (ANA, 2013).

In addition to the ANA, other professional groups and organizations and the federal
government have addressed the importance of reducing back injuries through policy changes and
collaborative initiatives. For example, in 2012, the National Institute of Occupational Safety and
Health (NIOSH)—the federal agency responsible for developing new knowledge in occupational
safety and transferring that knowledge into practice—identified strategies that institutions could
utilize to promote safety for workers and patients (Centers for Disease Control and Prevention
[CDC], 2016).
The growing understanding of the role of SPHM technology is also reflected in federal legislation recommendation of a national set of standards for patient safe handling and associated state legislation. In 2013, The U.S. House of Representatives considered a bill that was not successfully enacted. The Nurse and Health Care Worker Protection Act of 2013 (HR 2480) would have required the Occupational Safety and Health Administration (OSHA) to create and oversee the implementation of a similar set of standards (Kuehn, 2013).

“The safe patient handling, mobility, and injury prevention standard shall require the use of engineering and safety controls to perform handling of patients and the elimination of injuries from manual handling of patients by direct-care registered nurses and all other health care workers, through the development of a comprehensive program, to include the use of mechanical technology and devices to the greatest degree feasible. Where the use of mechanical technology and devices is not feasible, the standards shall require the use of alternative controls and measures, including trained, designated lift teams, to minimize the risk of injury to nurses and health care workers resulting from the manual handling of patients. The standard shall apply to all health care employers, shall generally align with interprofessional national safe patient handling, mobility, and injury prevention standards.” (H.R. 2480--113th Congress: Nurse and Health Care Worker Protection Act of 2013)

Implementation of the national and state-specific standards, including a multifaceted approach to SPHM, requires coordinated efforts on multiple levels. Hospitals, health care workers, government, and other health care organizations need to work together to ensure safety (Kuehn, 2013). The barriers to accessing the SPHM technology must be determined before
complete implementation of such programs can be successful. In institutions with SPHM programs, research shows not only reduced musculoskeletal injuries, but also recovery in approximately three years of the initial investments for the programs through the reduction of workers’ compensation expenses and time off work (Collins, Bell, & Gronqvist, 2010). However, despite the benefits of minimal lift equipment (MLE) utilized in SPHM programs, many nursing staff do not use the MLE (Stevens et al., 2013). The common barriers to SPHM technology utilization included supply and demand mismatches, the complexity and difficulty of equipment use, limited accessibility to staff, and improper maintenance (ANA, 2013). The ANA (2013) has concluded, based on their research review, that barriers to the SPHM technology can be resolved if leadership addresses the issues prior to the implementation of SPHM programs. These issues include ongoing education for all members of the health care industry regarding innovative programs and technological solutions that can effectively reduce the risk of injuries in nurses and other patient care providers (De Castro, 2006).

**Project Objectives**

The purpose of this EBP project was to use the existing evidence base to develop, implement, and evaluate a multifaceted educational approach to address the knowledge of nursing staff regarding SPHM and zero lift policies. The resultant information informs similar educational processes at other institutions within the same parent health care system. Specifically, the objective of this project was to determine the effect of the multifaceted intervention on nurses’ knowledge about occupational back pain and prevention, use of patient handling techniques, use of minimal lift equipment, and institutional compliance expectations. If short-term knowledge gain is documented, this EBP project may support longer-term evaluation
of outcomes (i.e., 12 months post-intervention) and evaluation of the translation of knowledge to patient handling skills.
CHAPTER 2: SYNTHESIS AND ANALYSIS OF SUPPORTING AND RELATED LITERATURE

Researchers have identified low back pain (LBP) as one of the reasons that nurses leave their jobs. The NIOSH recommends a patient handling weight limit of 35 pounds in ideal working conditions and less than 35 pounds when lifting is performed in awkward positions, such as lifting around equipment or when the lifter is fatigued (CDC, 2016). Some states in the United States have instituted no-lift polices and have enacted legislation encouraging or requiring health care facilities to have lifting devices available (Tullar et al., 2010). Minimal lift equipment has shown to reduce injury rates in nurses, but must be used in combination with other interventions, such as train-the-trainer, education, nurse champions, and hospital no-lift policies to be successfully utilized and implemented in nursing practice (Zadvinskis & Salsbury, 2010).

This literature review includes a summary of key considerations in developing, implementing, and evaluating educational initiatives to implement zero or minimal lift programs in the acute care setting. The search strategy involved identification and review of existing studies via Medline, Cochrane Library, Academic Search Premier, CINAHL and PubMed from 2005 to 2016. Keywords used either individually or in conjunction included: back pain, back injury, occupational health, nursing, lifting, worker’s compensation, patients, barriers, and physical therapy. Through the Oxford Centre for Evidenced Based Medicine, the researcher used evidence Level 1a through Level 4. Levels 1a and 1b evidence were the primary levels of evidence sought; however, the literature search revealed few Level 1a (systemic review of randomized controlled studies) and Level 1b (individual randomized controlled studies). As a result, the researcher also accepted Levels 2a, 2b, 3a, 3b, and 4 evidence for the review.
Satisfaction with Minimal Lift Equipment

Meeks-Sjorstrom, Lopuszynski, and Bairan (2010) explored nurses’ satisfaction with minimal lift devices and determined that nursing staff report that they want more education, encouragement, and management for the use of MLE and would be more likely to use MLE if it was more readily available. When measured using a 15-item questionnaire, satisfaction scores regarding MLE use increased 13% from prior to, to following a focused intervention that took place during a period of 6 to 8 weeks (Meeks-Sjorstrom, Lopuszynski, & Bairan, 2010).

Zero Lift Programs

In response to the need for mechanical lifts in rural hospitals, Charney, Lacy, Simmons, and Metz (2006) conducted a quasi-experimental descriptive study designed to measure the effect of implementing a zero lift program in participating hospitals within a workers’ compensation group. The researchers drew a convenience sample from 31 hospitals in Washington State (Charney et al., 2006). Using a pre-test/post-test questionnaire, Charney et al. compared patient-handling injury data prior to and post program implementation. Workers’ compensation claims were reviewed to include time lost injuries, frequency of injuries, total loss per claim, and health care cost per claim.

Study findings indicated although 35% of the total incurred claims cost for the system were attributable to patient-handling injury claims, several issues with larger scale implementation of zero-lift policies in rural health systems. (Charney et al., 2006). Initial investment dollars were not easily allocated in some hospitals and turnover rates in the small rural hospitals affected the quality of the program. Policy and procedures regarding zero lift practices varied between hospitals (Charney et al., 2006). Despite attempts at standardization across the system hospitals, some hospitals did not make it mandatory and continued to keep the
policy voluntary. Compliance with the policy was also a challenge during the first year of the study but improved with time. Finally, issues with standardization of equipment could not be resolved since operating guidelines allowed each hospital to choose its own equipment and vendor (Charney et al., 2006).

Despite all the challenges with implementing change across the different hospitals that were members of the workers’ compensation group, Charney et al. (2006) identified significant reductions in each category attributable to implementation of the zero lift programs. The zero lift programs led to statistically significant reductions in patient-handling injury claims (43%), time lost frequency rates (50%), and total incurred loss per claim (24%) (Charney et al., 2006).

**Multifaceted and Multidisciplinary Preventive Interventions**

Researchers have evaluated the effectiveness of nurse education about proper lifting techniques alone and in combination with other interventions. Traditional interventions for preventing back pain in nursing staff focus on information and training in handling patients with or without equipment. When evaluated in the workplace, traditional interventions have not had positive effects in reducing LBP rates (Carta et al., 2010).

Carta et al. (2010) implemented a multidisciplinary preventative intervention to educate nursing staff about patient handling techniques in an effort to prevent LBP. The main objectives of the a multidisciplinary preventative intervention were to improve workers’ knowledge regarding occupational LBP and prevention, learning and improving patient handling techniques, and reducing LBP rates in a 1,250-bed hospital (Carta et al., 2010). In the study, 140 nurses and health care assistants attended a 2-hour lesson and a 3-hour practical training session, and 48 nurses attended a train-the-trainer program that included a 3-hour class, 2-hour lesson on communication techniques, and 4 hours of practical training. To evaluate the effectiveness of the
program, trainers received a 20-question multiple-choice test developed to evaluate improvement in trainer knowledge (Carta et al., 2010). The questions addressed legislation, risk factors, preventive principles, equipment, patient handling techniques, and communication skills to evaluate improvement in trainer knowledge following training. The train-the-trainer program improved knowledge, communication skills, and the ability to evaluate manual handling techniques, which allowed the education program for patient-handling techniques to be extended to all health care workers in the facility (Carta et al., 2010). A statistically significant improvement was noted in questionnaire scores ($p < 0.001$) and handling techniques ($p < 0.001$), while use of equipment and low back symptoms improved remarkably (Carta et al., 2010). No specific intervention to prevent LBP was attempted at this hospital prior to the study. The result of this study showed that the education methodology was effective in achieving the short-medium objectives of 2 months and 6 months and that a train-the-trainer program adds value. However, a larger sample size with a control group and validation of the questionnaire would have strengthened this study (Carta et al., 2010).

In a quest to create a safer working environment for nurses providing direct patient care, Nelson et al. (2006) conducted a prospective study utilizing a single group, pre- and post-test evaluation. The researcher evaluated a multifaceted ergonomics program to determine the effectiveness in preventing injuries associated with patient handling. The program elements included an ergonomic assessment protocol, patient handling assessment criteria, peer leader role, back injury resource nurse, after action review, and a no-lift policy (Nelson et al., 2006). The program was implemented across seven health care facilities in 23 high-risk units (19 units in nursing homes and four in spinal cord injury units). The researcher collected data prospectively through surveys, weekly process logs, and cost logs (Nelson et al., 2006). A
random sample of 209 direct nursing staff was included in the pre-intervention survey. Nelson et al. identified statistically significant reductions in post-intervention injury rates ($p = 0.036$), number of modified duty days per injury ($p = .02$), and the number of self-reported unsafe patient handling days ($p = 0.27$). Overall, the program resulted in improvements in injury rates, modified duty days, job satisfaction, costs, and self-reported performance of unsafe patient practices (Nelson et al., 2006). Limitations of the study included the short 9-months study follow up period, which did not allow the investigators to address the long-term effect of the injuries as well as potential under-reporting of injuries by nursing staff. The study was consistent with other field studies where researchers supported a comprehensive ergonomics program to reduce musculoskeletal injuries in health care personnel (Nelson et al., 2006).

Black, Shah, Busch, Metcalfe, and Lim (2011) chose a retrospective, pre and post transfer, lift, and reposition (TLR) program intervention design, utilizing a nonrandomized control group to evaluate a multifactor injury prevention program designed to prevent patient handling-related musculoskeletal injuries. The TLR program consisted of engineering and administrative controls. Black et al. (2011) implemented the TLR program, which consisted of a one-time 8-hour training session, in the three intervention groups. Participants were educated on anatomy, injuries, body mechanics, personal health, lifting and patient handling procedures, standardized patient handling needs assessment, and patient handling algorithms (Black et al. 2011). A hands-on patient handling skills development component was also added to the one-day training. The three hospitals in the control group were similar to those in the intervention group. The researchers collected data via a questionnaire for 1 year pre- and post-intervention (Black et al., 2011). Results of the study showed evidence to support the effectiveness of a multifactor TLS program with results similar to other studies. A significant improvement in injury rates
occurred in the intervention group during pre- and post-period when compared to the control group. The relative risk of a musculoskeletal injury because of patient handling was statistically significant ($p = 0.0001$) for the post-intervention group, which experienced a 30.7% reduction in injuries (Black et al., 2011). The most significant decreases were seen in the number of lifting injuries. Transferring injuries were the second highest followed by repositioning injuries. Weaknesses of the study included the outcomes measured because of recall bias with symptom reporting on the questionnaire and the lack of validity and reliability of the questionnaire instrument. Overall, the study showed the implementation of a multifactorial injury prevention program could significantly reduce both time-loss and no-time-loss injuries and disability related to patient handling, especially in smaller hospitals (Black et al., 2011).

In response to a high level of injuries of health care professionals in a rehabilitation center, Theis and Finkelstein (2014) conducted a quasi-experimental study to evaluate the facility’s Safe Transfer Every Person Succeeds (STEPS) program. The objective of the study was to determine if staff injuries related to transfers could be reduced after the implementation of the STEPS program and be sustained during a 2.5-year period following the training period (Theis & Finkelstein, 2014). Theis and Finkelstein compared the number of staff injuries during the 1.5-year period post-training to the baseline pre-training. The sample included 56 health care professionals (nursing and therapy staff) with direct patient care for lifting. Data were collected from 55 participants using a pre- and post-competency assessment form. The STEPS program consisted of an 8-hour hands-on training class developed by the rehabilitation facility that covered nine steps. The STEPS included the following: (a) general overview of the purpose of the class; (b) comprehension of normal body movement; (c) definition of seven transfer techniques used on the unit; (d) hands-on practice in patient transfer techniques; (e) procedures
for safe patient handling; (f) problem solving for difficult situations, such as transferring when a patient is fatigued; (g) mock scenarios for safe patient handling; (h) return demonstration of seven transfers; and (i) post-competency of transfers check off. Staff needed to score an 80% to be considered competent. If they scored below 80%, the staff was required to attend STEPS for further training (Theis & Finkelstein, 2014).

The results of the study indicated a statistically significant reduction in the number of injuries post-training ($p = 0.01$) as compared to baseline (Theis & Finkelstein, 2014). These reductions were not sustained long term. This study showed that training in safe patient handling and the establishment of a safe patient handling program can reduce injuries. The results are similar to other studies, in which researchers reported a significant reduction in staff injuries through hands-on training incorporation of a multifactorial intervention. The limitations of the study included a small sample size, the lack of generalizability to a larger population, and a nonvalidated assessment tool (Theis & Finkelstein, 2014). The study could have been strengthened with a larger sample size that included a random sample and a control group.

Behavioral safety is an approach that companies can utilize to achieve reduction in workplace injuries. Nielsen, Sigurdsson, and Austin (2009) evaluated video scoring and feedback about scoring on patient transfers by staff of six nursing participants in a skilled nursing facility. The dependent variable was safety behavior for a one-person transfer. The results of the study suggested that information, video scoring, and feedback on lifting might increase safe patient lifts (Nielsen et al., 2009). Among nursing staff who participated, an observer recorded one lift for each participant during each shift near the beginning of the shift. During the intervention phase of the study, participants received a checklist and definitions of the safe components of two types of lifts, and during the video scoring phase, each participant used a checklist to score
the lifting behavior of the person performing the lift on videotape. The researchers added a feedback phase for two participants and all participants experienced treatment withdrawal (Nielsen et al., 2009). For five of the participants, information resulted in improvements. Although a small sample size, for two participants, safety feedback further improved safety.

Zadvinskis and Salsbury (2010) examined the effectiveness of a multifaceted minimal lift environment on self-reported equipment use, frequency of musculoskeletal injury, and workers’ compensation cost for patient-handling injuries using a mixed measures design with both descriptive and quasi-experimental design elements. A convenience sample (N=161) comprised of nursing staff members employed at two medical surgical units with similar patient acuity in a 1,000 bed regional acute hospital were enrolled in the study (Zadvinskis & Salsbury, 2010). The intervention group consisted of 86 nursing staff, on a 60-bed unit, working in a multifaceted environment where engineering (MLE), administrative (nursing policy written by the researchers based on evidence in literature), and behavioral (peer coaches) interventions were implemented. In comparison, the control group of 75 nursing staff, on a 42-bed unit, working in a nonmultifaceted environment received only the engineering intervention (Zadvinskis & Salsbury, 2010).

In the study, demographics and equipment use were self-reported by the nurses via a survey at the time of enrollment and 12 weeks later (Zadvinskis & Salsbury, 2010). No significant demographic differences existed between participants in the intervention and control groups. The intervention unit had significantly higher self-reported use of the floor-based lift ($p = .002$) and stand-assist device ($p = .0005$) than the control unit (Zadvinskis & Salsbury, 2010). In the multifaceted minimal lift environment, nursing staff members self-reported a reduction in patient-handling injuries and costs compared to nurses working in a nonminimal lift
environment; however, Zadvinskis and Salsbury (2010) did not report a $p$ value. These findings suggest that nursing staff working in a multifaceted minimal lift environment had fewer patient-handling injuries when using minimal lift equipment, which was similar to other studies. Limitations of this study included the nonrandomized sample with threats to external validity and the small sample size that limits the generalizability of the study population (Zadvinskis & Salsbury, 2010).

The Role of Education

Demoulin et al. (2012) conducted a systematic review of the randomized clinical trial (RCT) literature to explore the efficiency of preventive educational interventions, mainly focused on a biomechanical/biomedical model. Using the PubMed electronic database and the Cochrane Library, the authors identified nine studies in which researchers assessed the benefits of preventable educational interventions on the incidence of back pain, sick leave, and disability (Demoulin et al., 2012). The interventions varied markedly and in eight of the nine studies, no significant differences existed between the education and control groups regarding the incidence of back pain, disability, and sick leave. Only nine heterogeneous studies were included in the review with no consistency to the content of the intervention. However, the majority of the studies demonstrated significantly higher improvement in the education group compared to the control group for increase in knowledge. The authors pointed out that knowledge alone is not sufficient to induce change in habitual behaviors (Demoulin et al., 2012).

Karahan and Bayraktar (2013) explored the effectiveness of an education program to prevent LBP among nurses in Turkey. Sixty nurses participated in an interventional, one-group, pretest/posttest study conducted in four hospitals in Turkey (Karahan & Bayraktar, 2013). The researchers developed all tools and training booklets based on the literature available. The
booklet contained basic concepts, rules, and behaviors to prevent LBP among nurses. Karahan and Bayraktar (2013) used questionnaires to collect data, which were given to the nurses three months after the training sessions.

The training program consisted of 2 hours of theoretical content and 2 hours of practical application designed to parallel the investigators’ training booklet. Training programs were administered to six groups (10 to 16 individuals per groups) and divided between two days. The mean knowledge and procedure scores of the nurses were higher after just three months and after the training compared to before the training (Karahan & Bayraktar, 2013). Mean scores were statistically significant \( p < .017 \), as all behaviors increased just after training compared to the pre-training status. The researchers found that nurses with LBP benefited more from the training when compared to nurses without LBP. Theoretical and practical training on preventing LBP resulted in considerable increase in nurses’ knowledge in this study; however, the authors agreed that training alone is not sufficient for preventing LBP (Karahan & Bayraktar, 2013).

**Conclusion**

Nurses are at risk for injury because of the physical demands of their job. Strong evidence exists to support a multifaceted approach to reduce back pain and injury in nurses providing direct patient care. As the data suggest, education alone is not enough to sustain use of MLE or prevent injuries. Sufficient hands-on training in conjunction with educational materials can be effective to prevent work-related injuries (Zadvinskis & Salsbury, 2010). Although some costs are associated with purchasing and maintaining MLE, training and educating nurses on appropriate MLE, and peer coaches, the potential long-term cost benefit can have positive effects in the reduction of back injuries (Theis & Finkelstein, 2014). With the prevalence of work-related back injuries in nurses, the project leader of this project sought to apply a
reasonable and sustainable intervention using the evidence provided in the literature review to increase the knowledge of direct patient care nurses as it pertained to work-related back pain and injuries and prevention of such pain and injuries.
CHAPTER 3: PROJECT METHODS

The researcher chose the Stetler Model as the EBP methodological approach because it allows the application of research findings at the individual practitioner level and involves critical thinking as well as a logical process that emphasizes evaluation of the evidence (Fineout-Overholt, Levin, & Melnyk, 2004, 2005). The model provides a step-by-step approach that ensures that all steps of the EBP can be addressed in the process, which allows for an organized delivery of information and the accurate translation of research into clinical practice. Once the clinical practice problem is clearly identified, implementation of the Stetler Model occurs in five phases: (a) preparation, (b) validation, (c) comparative evaluation and decision-making, (d) translation and application, and (e) evaluation (Romp & Kiehl, 2009). The process of the DNP Project proposal presentation necessitated completion of the first three phases with the implementation of the intervention and its evaluation comprising the final two phases. Figure 1 depicts the timeline for the entire EBP, including the timeline for the implementation of the intervention and data collection.
### Timeline for EBP 2015-2016

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<td>Present EBP Concept to Safe Patient Handling Committee</td>
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*Figure 1. Timeline for the Effect of a Multi-faceted Educational Intervention*
Clinical Practice Problem Description

Back injuries in nurses are a significant contributing factor to the nursing shortage (Qin, Kurowki, Gore, & Punnett, 2014). The prevalence of back pain among nurses and patient care workers ranges from 30% to 60% and health care workers consistently rank among the top occupations with disabling back injuries (Qin et al., 2014). Researchers have estimated that back injuries among nurses in the United States cost $16 billion annually in workers’ compensation benefits and an additional $10 billion in medical treatment, lost workdays, modified work duty, and employee turnover (White, 2010).

Researchers have reported personal and ergonomic risk factors to increase back pain in nurses. Patient handling activities and a history of back pain were among the most common contributing variables to new episodes of back pain (June & Cho, 2010). The increasing bariatric burden has been another contributing factor on the rise since the 1970s (DuBose & Donahue, 2006). The percentage of U.S. adults considered obese has doubled from 15% in the late 1970s to 31% in 2005 (DuBose & Donahue, 2006). Nurses are frequently expected to manually handle obese patients, thereby increasing the risk of back pain and injury to themselves. While most industries do not require their employees to lift 90 pounds of weight without mechanical assistance, nurses are expected to do this without a second thought (Kuehn, 2013).

Organizational factors, such as staffing and longer shifts, are also linked to nurses’ back pain (June & Cho, 2011). As hospitals restructured, staffing decreased and hours were increased, resulting in the use of poor body mechanics and back injuries (June & Cho, 2011). As workload and hours of work increase, nurses become more physically and mentally exhausted. The prolonged strain from being “up on their feet” and handling patients during a long period may
lead to inappropriate body mechanics that result in strained muscles. Patient handling by nurses often occurs by bending at the waist and maintaining an uncomfortable posture towards the opposite side of the bed or chair. These positions can increase the risk of back pain (June & Cho, 2011).

Safe patient handling and mobility programs can reduce health care work-related injuries if they are properly implemented (ANA, 2013). Although many health care organizations have SPHM policies, they have not been able to sustain them or implement them successfully. In 2013, only 10 states had enacted laws related to the implementation of SPHM policies (ANA, 2013). Evidence indicates that the lack of SPHM policies is because of a lack of support from nursing management, bulky mechanical lift equipment, heavy equipment, the time-consuming use of equipment, lack of education regarding how to use the equipment, and culture (DuBose & Donahue, 2006). Universal SPHM standards are needed to provide a safe patient handling culture for the health care workers and to improve a positive outcome for patients (Stevens et al., 2013). Safe patient handling can enhance the overall quality of patient care and improve outcomes (DuBose & Donahue, 2006). Implementation of a sustainable minimal lift program may be beneficial for health care facilities. Finding and implementing the best evidence can be a challenge and requires a step-by-step process to develop and address the PICOT question (Facchiano & Hoffman-Snyder, 2012).

Phase I: Preparation—Getting Ready by Defining a Priority Need (Fineout-Overholt et al., 2004/2005)

In the first phase (preparation), as addressed in detail in Chapter 1, the clinical practice problem was refined to develop a PICOT format question specifically identifying the patient
population (P), intervention of interest (I), comparison of interest (C), outcomes (O), and time (T). The PICOT problem for this project was, In a sample of direct patient care nurses (P), what is the effect of a multifaceted intervention utilizing a minimal lift video, a written no-lift policy, peer coaching, and an educational booklet (I), on the level of knowledge to prevent back injuries (O) from pre- to post-intervention, 6 weeks later (C)?

**Phase II: Validation—Assessing the Body of Evidence by Systematically Critiquing Each Study in a Literature Review (Fineout-Overholt et al., 2004/2005)**

In the second phase, as addressed in detail in Chapter 2, the project leader conducted a literature search using Medline, Cochrane Library, Academic Search Premier, CINAHL and PubMed from 2005 to 2016. Collection of articles occurred using the keywords back pain, back injury, nurses, workers’ compensation, and prevention. The project leader systematically reviewed and analyzed each article and after summarized it relating to back pain in nurses (Fineout-Overholt et al., 2004/2005).

**Phase III: Comparative Evaluation and Decision Making—Determining the Use of the Evidence (Fineout-Overholt et al., 2004/2005)**

In the third phase, comparative evaluation, the project leader evaluated the ongoing evidence and decisions regarding its use in the specific setting determined. This involved (a) assessing organizational readiness and sustainability of the intervention through a Strength, Weakness, Opportunity, Threats (SWOT) analysis, and (b) structuring an EBP support team.

**Assessing Organizational Readiness and Sustainability.** Before beginning the project, it was important to identify risks involved and the readiness of the participants to participate and determine what barriers exist that may prevent the intervention from being implemented and
successful. Although minimal risk existed in participating in an educational program, certain factors must be considered prior to beginning the project. Stakeholders, management, and staff need to be aware of any direct and indirect costs that may be related to the project. In addition, the setting must be appropriate for the intervention. Through creating a chart to analyze strengths, weaknesses, opportunities, and threats and through a series of round table discussions with key hospital leadership staff and stakeholders, the investigator was able to determine that the setting was appropriate for this project and the leadership team was supportive.

EBP is recognized as a major health care initiative worldwide, supported by many important regulatory and accreditation groups, and is becoming part of the health care culture. However, a process must be undertaken for EBP to be accepted. Otherwise, sustainability of the evidence will be unsuccessful (Smith & Donze, 2010).

Key factors can determine if an organization is ready for changes in the health care environment. Each organization is unique and it is important that practitioners, who are implementing EBP into their own organization, understand the environmental readiness as it pertains to their own institution. These practitioners need to assess if their current health care environment is ready to respond to change (Smith & Donze, 2010). Identifying the obstacles is necessary before change can occur. Understanding of the existing organization’s infrastructure, cultural behaviors, the organization’s mission, financial resources, and the willingness for staff to change are essential to overcoming organizational resistance to change (Wood & Payne, 2012).

For EBP to be sustainable, it must be incorporated into the organizational culture. The organization must be committed to making EBP work in the institution by developing the right infrastructure and resources to support it. Leadership must be supportive and take action and not
just speak the words that it can and must be done (Smith & Donze, 2010). Educating the staff about the EBP process and its relationship to the delivery of quality patient care is important. Developing an EBP framework and team composed of nursing staff, clinical leaders, and clinical nurse specialists will facilitate the EBP process and engage the staff to participate and achieve excellence in nursing and patient care (Marshall, 2011). Gaining verbal commitment from the president of the hospital and nursing leadership team exemplified their dedication to this project and their support to improve the current working environment.

**SWOT analysis.** In effort to strive for excellence in a nursing organization, nursing leaders must understand the organization’s SWOT (Kalisch & Curley, 2008). Major transformations are often necessary to overcome weaknesses and threats and to optimize opportunities and strengths (see Table 1). Before implementing this project, it was necessary to complete a SWOT analysis as identified in Phase III of the Stetler model. By preparing the SWOT analysis, the researcher was able to determine that the setting was appropriate, the project would be beneficial to the staff and hospital, and that the project was feasible with the current staff and environment. The project leader acted as a consultant for the institution and determined that the strengths and opportunities far outweighed the weaknesses and threats. After meeting with the administrative staff, it was clear that this project was not only needed, but was also endorsed by senior management and staff.

Nurses play an important role in implementing EBP and determining an organization’s readiness for change. Many demands are placed on direct patient care nurses that make implementing EBP difficult. If EBP is not highly valued and supported by the leadership team, barriers, such as lack of time and commitment, will interfere or prevent implementation.
Successful implementation requires the organization to be ready at each level of the organization. Any barriers should be recognized and resolved prior to implementation. Each organization is responsible for developing nurse leaders who can implement EBP (Smith & Donze, 2010).
Table 1 *SWOT Analysis*

<table>
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<th>Strengths</th>
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<td>• Support from Employee Health and Safety Committee</td>
<td>• RN turnover rate is 18%</td>
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<tr>
<td>• ANCC Magnet Recognition</td>
<td>• Approximately half of (44.3%) of RNs who provide direct patient care</td>
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<tr>
<td>• Excellent patient care</td>
<td>have BSNs</td>
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<tr>
<td>• Vision for excellence in nursing</td>
<td>• RNs lack of authority to change practices</td>
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<tr>
<td>• Leadership team interest to improve patient and employee safety</td>
<td>• Misconceptions about EBP</td>
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<tr>
<td>• Sufficient MLE available on each unit</td>
<td>• Unclear workplace expectations</td>
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<tr>
<td>• Support from Leadership Team as determined in roundtable meetings</td>
<td>• Lack of access to resources such as MLE</td>
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<td>• Staff potentially unaware of hospital no lift policy</td>
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**Opportunities**
- Improve education to prevent back injuries
- Decrease costs related to lost days of work and medical costs associated with injuries
- Improve job satisfaction
- Improve patient care by providing safer working environment
- Increase education levels of nursing staff to BSN, MSN, DNP, & PhD
- Develop peer coaches on each unit
- Improve No-Lift policy understanding on each unit.

**Threats**
- Retain sufficient numbers of qualified nurses
- Lack of evidenced-based practice in nursing
- Aging population being admitted to hospital
- Aging baby boomer nurses retiring
- Employee health nurses ambition to implement project before completion
- Nursing shortage on each unit

**Structuring an EBP support team.** Since the project leader conducted this project as part of the requirements for a Doctor of Nursing Practice degree, Lisa Berge, PhD (i.e., the DNP student) headed the team and assumed major responsibility for project implementation. Dr.
Berge is a board certified family nurse practitioner working in occupational health and urgent care. Additional team members include institutional leaders and EBP champions who facilitated access to necessary institutional resources, provided material support for the project (i.e., teaching space), and helped facilitate implementation of the intervention. Dr. Berge’s DNP committee chair (Dr. Jairath), and committee members (Dr. O’Brien and Dr. Fieler), have also supported intervention development and evaluation.

**Phase IV: Translation and Application—Converting-Translating the Results and Implementing the Evidence-Based Change Plan (Fineout-Overholt et al., 2004/2005)**

This phase involved (a) ensuring institutional readiness, and (b) methods and procedures for intervention and analysis.

**Ensuring institutional readiness.** Consistent with Stetler’s model for EBP project implementation, the EBP team included key stakeholders who have helped establish institutional readiness at the hospital. In addition, with approval by the hospital Investigational Review Board (IRB), the project leader presented a formal PowerPoint presentation (Appendix A) in January 2016 to the administrators, nurse managers, employee health, Chief Operating Nurse, and hospital president to assess potential problems, determine the appropriate units, and gain commitment. The PowerPoint included a review of literature, need for the project, the units to implement the project, proposed timeline, and implementation plan. The meeting was well received with the President’s approval and request to begin as soon as possible.

**Methods and Procedures**

As justified in detail in Chapter 1, the purpose of this EBP project was to develop, implement, and evaluate a multifaceted educational approach based on evidence in the literature
to address the knowledge of nursing staff regarding SMHP and zero lift policies. The resultant information may inform similar educational processes at other institutions within the same parent health care system. Specifically, the objective of this project was to determine the effect of the multifaceted intervention on nurses’ knowledge regarding occupational back pain and prevention, use of patient handling techniques, use of minimal lift equipment, peer coaches, and institutional compliance expectations.

Setting

The project leader conducted the EBP project in a single community-based hospital in New Hampshire. The participating hospital is a regional, full-service health care system. The EBP project occurred at the main campus on three inpatient units that are comparable in patient lifting needs as well as in their access to MLE, specifically one rehabilitation unit (Unit A), one medical surgical and oncology unit (Unit B), and one medical surgical unit (Unit C). Each unit was equipped with MLE that was available for nursing staff use. The hospital did not add any new equipment to any of the units. The equipment was located in a central location on each unit that each nurse was familiar with before participation in the study. All nurses on each unit had been through a formal orientation to their unit and had received training on the MLE prior to participation in the study. Each employee at the hospital had also completed a pre-employment physical prior to beginning his or her job. The pre-employment physical included a back assessment and screening for previous back injuries. Each employee was approved through the physical to perform his or her job before starting.
Design

A pre-test/post-test design allowed the project leader to compare the knowledge before the multifaceted preventive intervention and 6 weeks after the implementation of the multifaceted intervention to prevent back pain and injuries. Unlike a research study, for this EBP project, an increase in overall knowledge of a zero lift policy and SMPH in addition to commitment to the use of zero lift approaches was desirable. The traditional threats to internal and external validity are not applicable for an EBP project compared to a research study since crossover effects such as improved staff attitudes to the intervention or increased knowledge of zero lift or minimal lift techniques would be desirable in achieving the larger goal of behavioral change at the institutional level. A weakness of the current design was that the reasons why nurses may not utilize MLE or request lifting assistance during a busy shift would not be detected. To partly compensate for this lack of qualitative data, the data collection instrument concluded with an open-ended section for additional comments and suggestions.

Program Intervention

The use of multifaceted interventions is more effective for disseminating evidence and is more likely to produce change than a single intervention, such as education (Melnyk & Fineout-Overholt, 2011). This project involved a multifaceted approach and the support of the leadership team to implement a sustainable intervention to prevent back pain and injuries in nurses. In addition, this project provided easy access to tools even after the completion of the project. These tools allowed nurses to be independent in accessing available resources to reduce and prevent back pain and injuries. Transforming this institution to utilize EBP in this setting
required ongoing persistence, patience, and perseverance of the leadership team (Melnyk & Fineout-Overholt, 2011).

The program elements included written (Appendix B) and video instruction pertaining to appropriate use of minimal lift equipment, ergonomics, lifting techniques, a no-lift policy, and use of peer coaches. Implementation of the written and video content was based on the literature supporting the appropriate use of MLE and reviewed by eight content experts (two physical therapists, two occupational health registered nurses, one board certified physiatrist who specializes in back injuries and ergonomics, and the three doctorally prepared RNs serving on my committee).

**Theoretical Approach**

The theoretical approach used to develop the intervention drew upon theories of adult learning and more general principles of teaching. In the real world of health care, not all employees are involved in the implementation of change and deciding to accept it or reject it. Involving staff members in change is critical to the change process and educating staff why change is necessary in practice (Lee, Faucett, Gillen & Krause, 2013). Knowles was the first to theorize how adults learn. Adults differ from children in learning and learn from motivation and past experiences. Knowles theorized that most adults enter learning to create change that encompasses a change in their skills, behavior, knowledge level, or attitudes about thing. In this project, nurses had the opportunity to learn from experiences, change their current behavior, and learn new knowledge to implement change. Adults when convinced that the new knowledge is necessary to improve their situation (Knowles, Holton, & Swanson, 1998) value learning new information. Consistent with principles of adult education and elements required for behavioral
change in nursing practice, the intervention included written material, video instruction, and group discussion. Participants had the opportunity to view the video independently as many times as they wished with a minimum requirement of viewing the video one time.

Knowles' theory of adult learning (i.e., andragogy) posits that adults are more motivated to learn when the subject matter has immediate relevance and effect to their job or personal life and adults are influenced by their past experiences (Knowles et al., 1998). To reinforce existing skills and to help staff self-correct any gaps in skills, two licensed physical therapist provided clear and concise instruction in the instructional video regarding each piece of MLE, and demonstrated use in the hospital setting using an empty patient room with a hospital volunteer playing the role of the patient. The video utilized in this project was created for the purpose of this project and has been filmed and edited by a professional film artist to ensure high quality. The investigator also specifically designed the written booklet for this project using literature and the MLE manufactures guidelines. References are listed within the booklet.

The length of the video reflected the prior socialization of nursing staff to the use of individual equipment, annual retesting regarding equipment use, and the importance of length-limited education specifically created for the nursing population participating in the project. Finally, the use of materials that participants could also access and review at their leisure allowed the researcher to acknowledge differences in the speed with which content is mastered and may assist staff with gaps in English language proficiency.

Behavioral controls were implemented through peer coaches and nursing management. Implementation of any new program requires a knowledgeable person with enthusiasm and leadership capabilities. A peer coach provided leadership, enthusiasm, facilitated knowledge
transfer on the program elements and equipment, and acted as unit experts. The peer coaches championed the project on each unit (Nelson, 2006). Peer coaches consisted of RNs, LNAs, and student nurses who volunteered to serve as peer coaches. The project leader then contacted the peer coaches via email and set-up a face-to-face meeting to review the project. Education by peer coaching occurs in peer-to-peer relationships and is not hierarchical. No potential for reward or punishment from the coach existed. The staff members and peer coaches worked with each other on an equal level to promote good outcomes and safety (Zadvinskis & Salsbury, 2010).

**Instrumentation**

To evaluate improvements in knowledge, the project leader administered a pre-test questionnaire (Appendix C) comprised of multiple-choice questions regarding legislation, risk factors, preventive principles, MLE, and patient handling techniques. The questionnaire included 12 multiple-choice questions and could result in a maximum score of 12. One point was awarded for each question answered correctly. The questionnaire was administered prior to the intervention and the same multiple-choice questionnaire was administered post-test, six weeks following the implementation of the intervention. The number of items on the questionnaire was within the range used in prior research and allowed rapid completion by staff.

No suitable instruments for capturing this data were found in the review of literature; therefore, the project leader designed a new instrument based on the literature for this project. The questionnaire was designed to address three domains: (a) demographic data, including characteristics of level of education, years of experience, and back health history; (b) the assessment of knowledge of nurses pre- and post-intervention; and (c) the assessment of the level of comfort with using MLE and the training pre- and post-intervention. Form 1 included nine
demographic questions pertaining to gender, age, education levels, specific occupation, years working, and the nurse’s back health history. Form 2 included 12 questions as a pre- and post-training questionnaire to determine nurses’ knowledge of the prevention of back pain and injury. The project leader prepared all of the questions in accordance with the training program content that included an education booklet (Appendix B), MLE instructional video, and a written no-lift policy. The questionnaire instrument has not been used in previous studies; therefore, no evidence other than face validity was available. Since the project leader found no other instrument for use, this investigator-designed tool, reviewed by eight experts for face validity, was appropriate for this study. The content of the educational intervention, specifically which in the educational booklet and video was based on evidence-based practice, OSHA guidelines, specific MLE manufacturing instructions, the ANA, and relevant literature related to the prevention of back injuries in nurses. To assess the degree to which the questionnaire adequately assessed knowledge related to the use of MLE and prevention of back pain and injuries, the questionnaire was pilot tested by a medical expert (board certified physiatrist) in the field of musculoskeletal injuries, one board certified occupational health RN, and two board certified physical therapists. The no-lift policy was developed by the safety committee team at the hospital and approved by administration.

**Procedures**

The project implementation began with the peer coaches. The nursing director (or acting nursing supervisor/manager) communicated via email to all nurses that the project was voluntary and they had the option to participate. The nursing director or nursing supervisor notified the researcher via phone or email after identification of the peer coaches. The project leader then
contacted the peer coaches via email to introduce and to set-up a face-to-face meeting to review the project. Following the completion of the peer coach training, nursing participants were invited to participate via verbal and written email communication. The project leader also placed informational flyers (Appendix D) in staff break rooms.

The pre-test questionnaire was located in the nursing director or manager’s office for a period of two weeks. Participants completed the pre-test questionnaire at their convenience and anonymously. Each participant was offered to receive or decline an optional $10 Target gift card at the completion of the questionnaire. The participant could choose to decline the gift card. Claiming the gift card was based on the honor system. The participant notified the project leader, via email, upon completion of the questionnaire and the project leader sent the gift card via interoffice mail in a sealed envelope to the appropriate unit. Participants were notified that by requesting their gift card, the program leader would not know their individual responses to the questions and would only know that they participated in the project open to all nursing staff on the three identified units. Participants were asked to write their mother’s two initials (first and last name) in addition to adding the month and day of their mother’s birthday in the upper right corner of the questionnaire to prevent duplicate responses and protect anonymity. Following the intervention, the second questionnaire (post-test) was administered six weeks later to the participants and included the same multiple-choice questions as the first questionnaire to assess their knowledge following the intervention. Each participant provided consent by completing the questionnaire. The project leader matched the pre- and post-questionnaires following completion and utilizing the month and day of their mother’s birthday in the upper right corner. All participants received information regarding how to contact the investigator.
Recruitment

The sample was drawn from direct care nurses (RNs, LNAs, and student nurses) on three inpatient units in a small community-based hospital located in New Hampshire. The project leader recruited a convenience sample of 32 nurses via an information flyer left in the break room on each floor and by their respective nursing supervisors, directors, or managers. In addition, the project leader recruited additional participants by rounding on each unit and approaching individual nurses and student nurse instructors. Sample selection criteria included (a) being an RN, LNA, or student nurse on one of the units participating in the project; (b) employed by the hospital as an RN or LNA; (c) provides direct patient care on unit A, B, or C; (d) is a staff member who was able to complete the questionnaire; and (e) staff older than 18 years of age.

Initial contact with the potential participants occurred by nurse managers or nurse directors on each unit. The project leader met with each manager and director to explain the purpose, recruitment, procedures, and timelines of the project. The nursing directors or managers introduced the program at a staff meeting and via email. Informational flyers were available in each break room. Staff members who did not participate in the project did not have access to the video, policy, or educational booklet, but could interact with the peer coaches and utilize MLE as part of their daily routines.

Data Collection

The participants were informed that the first questionnaire would take approximately 15 minutes to complete. Following the pre-test questionnaire, participants were asked to independently participate in an intervention that took approximately 1.5 hours to complete.
(independently reviewing the no-lift policy, independently viewing the instructional video, and independently reading the educational booklet). Participants could access peer coaches daily and were informed of their role via the information sheet.

The questionnaire was available on each of the three units in the offices of the nurse managers and directors. Each questionnaire took approximately 15 minutes to complete. Upon completion, the staff nurses returned the completed questionnaires to the nurse director or manager to place them in an envelope. The project leader obtained the completed questionnaires from the nurse managers and directors. The project leader made weekly visits to each unit throughout the 6-week period to meet with the nursing directors, managers, and peer coaches to ensure participants had access to the questionnaire.

**Outcomes Measured**

The outcomes measured pertained to the increase in the level of knowledge in nurses who participate in the intervention as compared to the level of knowledge before the intervention. The researcher measured outcomes at baseline (pre-intervention) and 6-weeks post intervention. Following analysis of the change scores, post-hoc analysis was performed to determine if any differences existed between the three units.

**Analysis Plan**

The project leader and her statistician computed descriptive statistics for demographic data. Data included age, race, occupation, years of employment, educational level, history of back pain or injury while working, and employment status. Descriptive analysis included frequency and percentages for nominal (categorical/dichotomous) data and means and standard deviations for continuous (interval/ratio) data. As appropriate, the project leader and statistician
performed bivariate analyses to examine relationships between demographic variables and questionnaire scores.

This EBP project involved use of inferential statistics to allow the project leader to answer the PICOT question. A $p$ value of less than or equal to 0.05 was used on all tests to determine statistical significance. To assess knowledge before and after the intervention, data obtained from the questionnaires were analyzed using SPSS software Version 22. The project leader and statistician performed an analysis using percentages, means, analysis of variance (ANOVA), and a dependent $t$-test to test pre- and posttest differences to consider the variation that may be present among all of the groups. The project leader and statistician performed a post hoc analysis to determine if unit differences existed (Terry, 2012).

**Implication**

Prior evidence suggests that nursing management must promote a minimal lift culture to increase use of MLE (Meeks-Sjostrom et al., 2010). Nurses must continuously utilize MLE to be effective in reducing back pain and injuries (Meeks-Sjostrom et al., 2010). Safety teams are needed in hospitals to educate staff regarding the use of proper body mechanics and the use of MLE to reduce manual lifting. Leaders and managers are key members of the organization in addressing this issue and reducing the number of injuries among nurses (Gropelli & Corle, 2011).

Nurses and direct patient care workers can benefit from improved safety in the workplace. To protect workers, health care organizations must financially invest in the substantial cost of technology to assist workers with lifting (Kuehn, 2013). Data suggest that the investment in mechanical lifts can reduce the overall costs of medical claims and lost days of
work (Kuehn, 2013). The mechanical lift may cost $8,000–10,000, but the injury to an employee can cost the health care facility more than $150,000 in lost workdays and other associated costs (Kuehn, 2013). An analysis of the financial benefit is needed to demonstrate the value of investing in comprehensive SPHM programs. Sophisticated models provide a wide range of savings for direct costs (lost days of work, medical claims, worker’s compensation) and indirect costs (management time, turnover, and patient and staff satisfaction) related to health care injuries (ANA, 2013).

Behavioral change is necessary to implement evidence-based practice in complex health care systems. Achieving behavioral change in clinical environments requires the assessment of clinicians’ recognition for the need for change and the readiness to make the change (Kresse, Kuklinski, & Cacchione, 2007). A barrier to the dissemination of EBP is the lack of knowledge regarding implementation processes. Successful implementation requires the constructive involvement of key stakeholders and critical clinical staff (Rapp et al., 2010). Education alone is not sufficient to change behavior. Successful integration occurs when evidence is robust and the environment is receptive to change. The change process must also be appropriately facilitated by establishing a formal EBP project implementation team early in the process. Establishing the leadership team to guide the implementation and building excitement during the implementation period are also key factors in the success of the EBP change (Melnyk & Fineout-Overholt, 2011).

**Ethical Considerations**

An application for exempt status was submitted to the hospital IRB and the CUA Committee for Protection of Human Subjects given that all data would be collected
anonymously, consent was implied by completion and submission of the questionnaires, and risk was absent or minimal. Prior to initiation of the project, the project received IRB approval with exempt status from both the clinical site and the academic institution. All participants received written explanation regarding the aim of the project and the use of implied consent by completing the questionnaire. Further, nurses who did not wish to participate in the project had the opportunity to access project materials and resources. Integrity of data files was safeguarded by use of a password-protected computer for data entry.

**Budget and Cost Analysis**

This project was fully funded by the project leader, the DNP(c), Lisa Berge. The majority of costs were personnel expenses for the time spent on the project and analyzing the data. Table 2 outlines the financial budget of the project. The practice setting was at no direct cost to the project leader. As part of a quality improvement project, the site volunteered their time to participate. An optional $10 Target gift card was awarded to participants who completed the final questionnaire; however, participants were not required to accept the gift card. In addition, no overtime was awarded for any participants or nonparticipants who may have stayed late because of the project. No loss of revenue occurred for the hospital. The aim of this project was to improve work safety by improving knowledge of the use of MLE and eliminate manual lifting. Based on the low cost of this project, it was the DNP(c)’s belief that the benefit of the project would outweigh the cost and time necessary for implementation and analysis of the data.
### Table 2 Project Budget

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Dollar Amount (USD)</th>
<th>Allocation</th>
<th>Total (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Development</td>
<td>500.00</td>
<td>500.00</td>
<td>500.00</td>
</tr>
<tr>
<td>Travel</td>
<td>462.00</td>
<td>500.00</td>
<td>500.00</td>
</tr>
<tr>
<td>Software/Paper</td>
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<td>80.00</td>
<td>80.00</td>
</tr>
<tr>
<td>Gift Cards</td>
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<td>30 questionnaires</td>
<td>300.00</td>
</tr>
<tr>
<td>Printer Ink</td>
<td>55.00</td>
<td></td>
<td>55.00</td>
</tr>
<tr>
<td>Meeting space</td>
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<td>Site meeting space</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>1435.00</strong></td>
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</table>
CHAPTER IV: RESULTS (PROJECT IMPLEMENTATION)

Introduction

This project sought to address the SPHM and zero-lift policies knowledge of nursing staff through the implementation and evaluation of a multifaceted educational intervention. Nurses were given a questionnaire assessing overall knowledge of zero lift policies and SMHP pre-intervention and post-intervention in order to assess any changes in knowledge. This chapter will detail the results of the analysis of this intervention.

Pre-Analysis Data Cleaning

A total of 32 nurses participated in this protocol. Prior to the main analyses, the data were assessed for large portions of missing data (>50%). There were 14 participants who did not complete the post-test questionnaire. As such, these participants were removed from the dataset, resulting in a final sample of 18 participants whom completed both the pre-test questionnaire and the post-test questionnaire. In addition, the 18 participants were paired accordingly.

Demographic Findings

The final sample consisted of 16 women (88.9%) and two men (11.1%), with a mean age of 30.44 \( (SD = 8.11) \). The majority of participants were white \( (n = 11, 61.1\%) \). Half of the participants have earned a bachelor’s degree \( (n = 9) \), three participants earned an associate’s degree \( (16.7\%) \), and the remaining six participants had some college but no degree \( (33.3\%) \). Eight participants \( (44.4\%) \) reported their current occupation as “other” and wrote in variations on “student”, while six participants reported working as a registered nurse \( (33.3\%) \), and four participants reported working as a licensed nursing assistant \( (22.2\%) \). Most participants were working full time on one unit \( (n = 8, 44.4\%) \), two participants were working part time on one unit \( (11.1\%) \), five participants were employed per diem on one unit \( (27.8\%) \), one participant was employed per diem as a float nurse \( (5.6\%) \), and two participants indicated “other” as their
employment status (11.1%). Of those who had at least a year of bedside nursing experience, the mean years of experience were 4.94 ($SD = 6.90$) years. Of those who had less than a year of bedside nursing experience, the mean years of experience were 1.65 ($SD = 2.91$) months. Four participants reported experiencing a back injury as a nurse (22.2%). Two participants with a back injury reported their injury to a supervisor (11.1%), and two did not (11.1%).

On the pre-test questionnaire, most participants reported that they sometimes feel comfortable using minimal lift equipment ($n = 7, 38.9$), and most indicated that they always felt comfortable using minimal lift equipment with their colleagues ($n = 8, 44.4$%). The largest percentage of participants indicated that they felt very satisfied with the training they have received in their current position on body mechanics and the use of minimal lift equipment ($n = 7, 38.9$).

On the post-test questionnaire, most participants reported that they often feel comfortable using minimal lift equipment available on their unit ($n = 7, 41.2$%). The largest percentage of participants remained feeling always comfortable using minimal lift equipment with their colleague ($n = 8, 47.1$%), and reported being very satisfied with the training they have received ($n = 7, 41.2$%). A majority of participants reported reviewing the minimal lift equipment video one time ($n = 11, 61.1$%), two participants reviewed the video twice (11.1%), and five participants did not answer this question (27.8%). Of those who reviewed the video, most ($n = 13, 92.9$%) indicated that they found the video helpful in guiding them to use minimal lift equipment. Table 3 presents means and standard deviations for continuous level variables. Table 4 presents frequencies and percentages for nominal variables.
Table 3

*Means and Standard Deviations for Continuous Demographic Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
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<tbody>
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<td>Age</td>
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<td>46</td>
<td>30.44</td>
<td>8.11</td>
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<tr>
<td>Years of Nursing Experience</td>
<td>0</td>
<td>25</td>
<td>4.94</td>
<td>6.90</td>
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<td>Months of Nursing Experience (if less than 1 year)</td>
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<td>10</td>
<td>1.65</td>
<td>2.91</td>
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</table>

Table 4

*Frequencies and Percentages for Nominal Demographic Data*

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<th>%</th>
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<tr>
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</tr>
<tr>
<td>Female</td>
<td>16</td>
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<td>Ethnicity</td>
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<td>White</td>
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<td>61.1</td>
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<tr>
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<td>5.6</td>
</tr>
<tr>
<td>American</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>1</td>
<td>5.6</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>5.6</td>
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**Employment Status**

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<thead>
<tr>
<th>Status</th>
<th>Count</th>
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<tr>
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<td>44.4</td>
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<tr>
<td>Working part time on one unit</td>
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<td>11.1</td>
</tr>
<tr>
<td>Per diem on one unit</td>
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<td>27.8</td>
</tr>
<tr>
<td>Per diem float nurse</td>
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<tr>
<td>Other</td>
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<td>11.1</td>
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**Education**

<table>
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<tr>
<th>Level</th>
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<tr>
<td>Some college no degree</td>
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<td>33.3</td>
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<tr>
<td>Associate’s degree</td>
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<td>16.7</td>
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<tr>
<td>Bachelor’s degree</td>
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**Current Occupation**

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</thead>
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<td>Licensed Nursing Assistant</td>
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<td>22.2</td>
</tr>
<tr>
<td>Registered Nurse</td>
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<td>33.3</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>44.4</td>
</tr>
</tbody>
</table>

**Back Injury as a Nurse**
<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4</td>
<td>14</td>
<td>22.2</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>14</td>
<td>77.8</td>
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</tbody>
</table>

**Reported Injury**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
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<th></th>
</tr>
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<td>2</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>2</td>
<td>11.1</td>
</tr>
</tbody>
</table>

**Pre-test:**

Do you feel comfortable using minimal lift equipment that is available on your unit to lift patients?

<table>
<thead>
<tr>
<th></th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarely</td>
<td>2</td>
<td>7</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>11.1</td>
<td>38.9</td>
<td>22.2</td>
<td>27.8</td>
</tr>
</tbody>
</table>

Do you feel comfortable using minimal lift equipment with your colleagues to safely lift or transfer a patient?

<table>
<thead>
<tr>
<th></th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rarely</td>
<td>0</td>
<td>7</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>38.9</td>
<td>16.7</td>
<td>44.4</td>
</tr>
</tbody>
</table>
Are you satisfied with the training you have received in your current position on body mechanics and the use of minimal lift equipment to safely lift or transfer a patient?

- Not at all satisfied: 1 (5.6%)
- Slightly Satisfied: 5 (27.8%)
- Moderately Satisfied: 2 (11.1%)
- Very Satisfied: 7 (38.9%)
- Extremely Satisfied: 3 (16.7%)

Post-test:

Do you feel comfortable using minimal lift equipment that is available on your unit to lift patients?

- Rarely: 1 (5.9%)
- Sometimes: 5 (29.4%)
- Often: 7 (41.2%)
- Always: 4 (23.5%)
Do you feel comfortable using minimal lift equipment with your colleagues to safely lift or transfer a patient?

- Rarely: 0 (0.0)
- Sometimes: 4 (23.5)
- Often: 5 (29.4)
- Always: 8 (47.1)

Are you satisfied with the training you have received in your current position on body mechanics and the use of minimal lift equipment to safely lift or transfer a patient?

- Not at all satisfied: 0 (0.0)
- Slightly Satisfied: 3 (17.6)
- Moderately Satisfied: 5 (29.4)
- Very Satisfied: 7 (41.2)
- Extremely Satisfied: 2 (11.8)

Did you find the video helpful in guiding you to use minimal lift equipment?
Zero-lift and SPHM Knowledge Findings

In order to assess the change in nurse’s general knowledge of zero-lift policies and SPHM, a dependent $t$-test was performed. The variables used in this analysis corresponded to the number of correct responses pre-test and the number of correct responses post-test. Prior to the analysis, the assumption of normality was assessed using a Kolmogorov-Smirnov (KS) test. The KS test was not significant ($p = .200$), indicating that normality can be assumed.

The results of the dependent samples $t$-test were significant, $t(17) = -3.94, p < .001$. This indicates that there were significant differences between the number of correct responses pre-test and post-test. Examination of the means indicated that pre-test, there was an average of 6.44 correct responses out of a maximum of 12 ($SD = 2.09$). Post-test, there was an average of 9.28 ($SD = 2.05$) correct responses out of 12. Table 5 presents the full results of this analysis.

Table 5  
Results of the Dependent Samples $t$-Test

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test Correct Responses</td>
<td>6.44</td>
<td>2.09</td>
</tr>
<tr>
<td>Post-test Correct Responses</td>
<td>9.28</td>
<td>2.05</td>
</tr>
</tbody>
</table>

Note: $t(17) = -3.94, p < .001$
Aancillary Analysis

As there were numerous participants who did not complete both the pre-test and post-test questionnaires, additional analyses were performed to explore these participants’ scores on the portions of the questionnaire they did complete. There were five participants who fully completed the pre-test questionnaire, and two who fully completed the post-test questionnaire. These seven participants had an average score of 8.00 ($SD = 2.38$) correct responses out of 12. The five participants who only completed the pre-test questionnaire had an average score of 7.20 ($SD = 1.92$) correct responses out of 12, and the two who only completed the post-test questionnaire had an average score of 10.00 ($SD = 2.83$) correct responses out of 12.

Summary

Nurse’s knowledge of zero-lift policies and SPHM was assessed using a pre-test post-test design. The number of correct responses was higher on the post-test. A dependent samples $t$-test was performed, which indicated that this increase in correct responses was statistically significant. The following chapter will discuss these results, along with any strengths and limitations of the project.
CHAPTER V: DISCUSSION AND CONCLUSIONS

Introduction

This EBP project sought to develop, implement, and evaluate a multifaceted educational approach that is based on evidence in the literature to address the knowledge of nursing staff regarding SMHP and zero-lift policies. The results of this project may be utilized to inform similar educational processes at other institutions within the same parent health care system.

Specifically, the objective of this project was to determine the effect of the multifaceted intervention upon nurses’ knowledge about occupational back pain and prevention, use of patient handling techniques, use of minimal lift equipment, peer coaches, and institutional compliance expectations. Since there were no suitable instruments for capturing this data found in the review of literature, a new instrument based on the literature was designed for this project. The questionnaire was designed to address three domains: (1) demographic data, including characteristics of level of education, years of experience, and back health history, (2) assessment of knowledge of nurses pre- and post-intervention, (3) assess level of comfort with using MLE and the training pre- and post-intervention.

To determine if knowledge was increased using a multifaceted approach, this project employed a descriptive design to measure the increase in the level of knowledge in a sample size of 18 nurses who participated in the intervention as compared to the level of knowledge before the intervention. Knowledge was measured by answers to 12 specific questions in section three of the questionnaire. Data was analyzed and the results were presented in chapter 4. In addition, chapter 4 concluded with description of some of the limitations of the study.

Consistent with Phase V of the Stetler Model, Evaluation, chapter five concludes this project, beginning with the review of literature and analysis of the results of the project to
comprehensively determine if the level of knowledge in reducing back injuries is increased in nurses following a multifaceted approach and intervention. This section contextualizes the results of the project. Next, the chapter presents the implications of these conclusions to nurses, followed by a review of the presumed and discovered limitations of the project. Chapter five then presents recommendations for nurses and administrators for further research based on the conclusions and implications of this project. This chapter ends with a conclusion.

**Discussion**

This EBP project compared the knowledge before the multifaceted preventive intervention and 6 weeks after the implementation of the multifaceted intervention to prevent back pain and injuries. The multifaceted intervention included visual instruction utilizing the MLE video, individual review of the no-lift policy, peer coaches, and an educational booklet. It cannot be determined how this multifaceted intervention will directly affect injuries, as this was not evaluated. However, this project has demonstrated a statistically significant improvement in knowledge after implementing a multifaceted program that includes training and education of MLE.

The importance of appropriate training and education was emphasized in the review of literature. Karahan and Bayraktar (2013) reported theoretical and practical training on preventing LBP resulted in considerable increase in nurses’ knowledge. Carta et al. (2010) implemented a multidisciplinary preventative intervention to improve workers’ knowledge regarding occupational LBP in a 1,250-bed hospital. A statistically significant improvement was noted in questionnaire scores ($p < 0.001$) and handling techniques ($p < 0.001$), while use of equipment and low back symptoms improved remarkably (Carta et al., 2010).
The ability to achieve the objective of this project was predicated upon an administrative environment, which is support EBP. The SWOT analysis conducted at the beginning of this project indicated the existence of such an environment and the support of leadership. However, institutions can change rapidly due to unexpected factors that may affect implementation. Specifically, the changes in administrative structure and reporting responsibilities on some of the units changed due to temporary medical leaves at the commencement of the implementation phase. Such changes may have posed barriers for nurses to participation in the project. Responsibilities may have shifted as well as priorities in completing goals and objectives on each unit. Nurses who may have opted to participate may not have had the opportunity due to changes in staff. This is of concern both in terms of environmental culture, but also in terms of nurses’ health and susceptibility of injury.

As previously anticipated, Knowles Theory of Adult Learning (i.e. andragogy) was not fully supported throughout the implementation of the project. As indicated by Knowles Theory of Adult Learning, adults posits that adults are more motivated to learn when the subject matter has immediate relevance and impact to their job or personal life (Knowles et al., 1998). This was not evident during the project as many nurses did not participate in the project. However, it should be emphasized that reasons for not participating are unknown and may not reflect their interest to learn. Therefore, participation may be unrelated to their level of interest in the project and gaining more knowledge in reducing back injuries.

Limitations and Barriers

There are limitations in this project that warrant consideration. The major limitation of this project were related to sampling (i.e. small sample, sample attrition and convenience sampling approach) which will largely prevent generalizability to the nursing population at large.
The best way to minimize confounding variables would have been to use a similar questionnaire and randomly select participating nursing units at multiple institutions within the same parent company. However, this was difficult to obtain given the nature of this project. The nursing units in this project were chosen based on patient mobility needs and ergonomic demands for medical-surgical nursing. In addition, the lack of external evaluation of the questionnaire and relatively short duration of the project are potential weaknesses of the project.

Threats to internal validity may have been affected by other events occurring on the units that distracted participants from the focus of the project (Polit & Beck, 2010). For example, at the time of the implementation, there were some changes in management as well as staff members due to unexpected medical leaves. In addition, peer coach enthusiasm may have been another varied on different units and as time progressed.

In addition, a threat to external validity is warranted in this project due to a small sample size and therefore limiting the generalizability (Polit & Beck, 2010). Because this project was implemented on only three units in a rural hospital, the nursing sample may not be representative of all nurses throughout the country. It should also be noted that the majority of nurses participating in this project were LNAs and not RNs. This may have some significance in regards to the level of education as well as the amount of lifting that LNAs do when compared to RNs. In addition, eight (44.4%) of participants were student nurses. This is important to note as students might not be familiar with the culture and may not have had previous exposure to the no-lift policy. Students may also have a different learning curve or patterns than regular staff. Their exposure and experience to the institution may be different. Students may have received recent teaching regarding the importance of a no lift environment. This may have decreased their overall learning curve.
Anticipated barriers that did affect the project included: small numbers of nursing participation, timing of maternity leaves, and staff positions with travel nurses who may not be familiar with the safety culture of no-lift policies. Additional barriers include incomplete questionnaires. Future implementation of this project might be improved with a validated questionnaire that has been piloted before being utilized before implementation to determine barriers to completion. A focus group may also be beneficial to receive feedback regarding the questions and amount of time to complete the questionnaire. This may reduce any confusion regarding the questionnaire, minimize incomplete questionnaires, and perhaps reduce the number of questions to answer if time is a factor in completion.

**Sustainment Plan**

As previously discussed in Chapter three, for EBP to be sustainable, it must be incorporated into the organizational culture. Continued planning and attention will be necessary to create a culture for safe patient handling. The objective of this EBP was to assess knowledge in nurses. As discussed in the review of literature, education alone is not sufficient to change behavior and therefore an increase in knowledge is only one aspect of successful implementation of a multifaceted program to reduce injuries and back pain in nurses.

Successful implementation and sustainment of the project begins with the senior leadership team and includes all staff members who provide direct patient care. Determination of the sustainability of this project will be dependent on several factors: commitment and support from senior leadership, nursing directors and nurse managers, and individualized plans for the various needs of each unit. As noted in the SWOT analysis, this project received positive feedback and support by the senior leadership team during the pre-implementation phase. Their
commitment to successful implementation has also continued in the post implementation phase with continued focus and commitment of patient and employee safety.

In the post project phase, implementation of the project has been piloted as part of the nurse resident training program. A one-hour session was conducted on November 30, 2016 which entailed a PowerPoint to review the educational booklet and specific review of the available MLE, a review of the video, the role of a peer coach, and review of the no lift policy. Based on the positive feedback from the initial pilot training, all future nursing resident program training will include a one-hour training session that utilizes the multifaceted approach to reduce injuries and back pain. In addition, the project leader has secured a meeting with members of the senior leadership team to discuss continued implementation of this project throughout the hospital and there are plans to expand the safe patient handling committee to include peer coaches.

**Implications for Nursing**

As the U.S. nursing force continues to age and patient obesity continues to increase, recruitment, retention, and succession planning will be a major focus for healthcare (Mayeda-Letourneay, 2014). Research suggests a need for immediate change in effort to create a safer working environment and culture for nurses. Safe patient handling and mobility programs can reduce health care work-related injuries if they are properly implemented to be sustainable.

Nurses must continuously utilize MLE to be effective in reducing back pain and injuries (Meeks-Sjostrom et al., 2010). Safety teams and routine safety meeting are needed in the hospital to educate staff on the use of proper body mechanics and the use of MLE to reduce manual lifting. Leaders and manager are key members of the organization in addressing this issue and reducing the number of injuries among nurses (Gropelli & Corle, 2011).
Nurses play an important role in their own safety and patient safety. Nursing management has an opportunity to promote a culture that supports the regular use of MLE and adherence to a no lift policy. An opportunity exists to increase awareness in nurses regarding the benefits of MLE and adherence to the no lift policy. However, education alone is not sufficient to prevent back injuries and should be used in conjunction with other components to include engineering (MLE), administrative (nursing policy), and behavioral (peer coaches) (Zadvinskis & Salsbury, 2010).

A sustainable program to reduce back pain and injuries in direct patient care nurses is essential in preserving their health and well-being. Manual lifting should no longer be an option for nurses. Evidence based programs to prevent manual lifting can be an effective way for hospitals to reduce the number of injuries related to manually lifting patients.

**Recommendations**

Several opportunities exist to expand this project. The implementation phase and post project phase identified several barriers to successful implementation. Such barriers will need to be addressed before implementing this project in other units of the organization. In the immediate post project phase, the project leader will meet with the leadership team to review the statistically significant results of this project. Suggestions to improve implementation and sustainability will be discussed to determine the most effect approach to implement the program.

Although this project resulted in statistically significant results, the objective was to assess knowledge of a multi-faceted approach and results of this project cannot predict reductions in back pain or injuries. The addition of a skills assessment may assist nursing management in identifying areas that may require additional education and visual demonstration of the proper use of MLE. In addition, since the types of MLE may vary on each unit, it will be
necessary perform individual reviews of each unit to ensure nurses receive specific instruction and education that is specific to the unit’s MLE. For example, the intensive care unit (ICU) is equipped with ceiling lifts and patient needs differ than that of a medical surgical unit. Therefore, individualized programs might be beneficial for optimal compliance.

Upon completion of this project, the project leader recommends that peer coaches be utilized on each unit to champion the program and implementation. The senior leadership team can continue to promote a culture of safety for their staff by engaging managers and staff to fully embrace the importance and purpose of the no-lift policy. Although many nurses participating in the project did not utilize the video, an opportunity exists to incorporate utilization of the video during new hire orientation as well as ongoing training and skills assessment.

Given the impact that back pain and injuries have on nurses’ wellbeing, the successful implementation of a program that may reduce back pain and injury is an essential part of retaining qualified nurses and may ultimately reduce costs related to lost wages and medical costs. To improve nursing participation, the addition of continuing education units as an incentive may be prudent while implementing the project on each unit. In addition, staff meetings and monthly safety committee meetings can provide an opportunity to how to improve reporting of back injuries. Results of this project revealed that 22.2% of the participants reported a back injury and only half (11.1%) reported the injury. Adding additional education and encouraging open discussions regarding the importance of reporting injuries may help increase awareness for nurses’ and empower them to take an active role in their wellbeing in the workplace.

Based upon the statistically significant outcomes of this project, other hospitals and rehabilitation facilities may benefit from implementing an evidenced based multifaceted
program. It is recommended that all components of this project should be utilized and should include administrative (no lift policy), behavioral (peer coach), and engineering (MLE). The benefit of each component was not individually tested and therefore the project leader cannot recommend individual use. The results of this project demonstrated short-term knowledge gain. Longer-term evaluation of outcomes (i.e., 12 months post-intervention) and evaluation of the translation of knowledge to patient handling skills may provide additional data.

Conclusion

Creating an environment and culture for safe patient handling can be facilitated by implementing an evidence-based multifaceted program to prevent back pain and injuries. Although it is not known how many injuries might be prevented from utilizing a program like this, this project did result in statistically significant results. The multifaceted approach should include the use of MLE, peer coaches, institutional compliance with a no lift policy, and review of a MLE video.
REFERENCES


APPENDIX A: LEADERSHIP PRESENTATION

Multifaceted Intervention Program to Prevent Back Pain and Injuries in Nurses

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Background

- Work-related musculoskeletal disorders continue to be the leading occupational health problem among nurses.
- Back injuries in nurses are largely due to patient handling – the lifting and transfer of patients.  
- The prevalence of back pain among nurses and patient care workers ranges from 30% to 60% and healthcare workers consistently rank among the top occupations with disabling back injuries.  
- It has been estimated that back injury costs nurses in the United States $10 billion annually in medical compensation, lost and reduced work days, and employee turnover (White, 2010).

Background Continued

- Safe patient handling and mobility (SPHM) programs can reduce healthcare work-related injuries and MSD if they are properly implemented.  
- Although many healthcare organizations have SPHM policies, they have not been able to sustain them or implement them successfully.  
- Evidence indicates that this is due to lack of support from nursing management, bulky mechanical lift equipment, heavy equipment, time-consuming to use the equipment, lack of education on how to use the equipment, and culture.  

Implications for Nursing

- Evidence suggests that nursing management must promote a minimal lift culture to increase use of MLE.
- Nurses must continuously utilize MLE to be effective in reducing back pain and injuries.
- Safety teams are needed in hospital to educate staff on the use of proper body mechanics and the use of MLE to reduce manual lifting.
- Leaders and managers are key members of the organization in addressing this issue and reducing the number of injuries among nurses.

Purpose

- The purpose of this EBP project is to determine if there is a difference in nurses’ knowledge of preventing back pain and injuries before implementation of a multifaceted educational program and six weeks after the implementation of the program.
- Knowledge will be defined by answers to specific questions in a pre-test and post-test questionnaire.

PICOT

- **P**: Population will include nurses on two inpatient units who provide direct care to patients.
- **I**: Intervention will include education, nurse champion, a policy, and MLE video.
- **C**: Comparison will include the level of knowledge before the implementation of education, nurse champion, and policy compared to the level of knowledge after the implementation.
- **O**: Outcomes nurses will have increased knowledge of the institutional policy on lifting, the use of minimal lift equipment, and preventative lifting techniques to avoid injury or pain to prevent injury and pain.
- **T**: Time the EBP will take approximately 6-12 weeks to complete.
STUDY DESIGN

- A quantitative study, using a pre-post-test design without a control group will be used to evaluate the knowledge level of a multifaceted preventive intervention designed to prevent injury in nurses providing direct patient care.
- The program will be implemented on three medical-surgical inpatient units.
- The program elements will include instruction on appropriate use and utilization of minimal lift equipment, ergonomics, lifting techniques, nurse champion, and a no lift policy.

OBJECTIVE

- The main objectives of the program will be to improve worker's knowledge about occupational back pain and prevention, learning to improve patient handling techniques, utilizing minimal lift equipment, and improving compliance to a no lift policy.
- To evaluate improvements in knowledge, a pre-test comprised of 18 multiple-choice questions regarding legislation, risk factors, preventive principles, ME, and patient handling techniques will be administered.
- The questionnaire will be administered prior to the intervention and the same 18 question post-test questionnaire will be administered 6-12 weeks following the implementation of the intervention.

PRETEST/POSTTEST DESIGN

- A pre-test/post-test design was chosen to look at the outcomes of knowledge before and after implementation of the intervention and after the intervention.
- Weaknesses that accompany this type of design include the lack of a control group and randomization. However, this type of design is the only practical method for assessing knowledge and the overall impact of the intervention.
Recruitment

- The sample will be drawn from direct care nurses (RNs and LNAS) on three inpatient units.
- A convenience sample of 10 nurses will be recruited. Sample selection criteria include: (a) RN or LNA employed by the hospital as an RN or LNA, (b) provide direct patient care on unit A, B or C, (c) staff who are able to complete the survey, and (e) staff over the age of 18 years.

IRB APPROVAL

- Approval of this study will be obtained from the hospital IRB and Catholic University of America's IRB.
- Initial contact with the potential subjects will be done by providing the nurse managers and nurse directors on each unit with an informational sheet, which will explain the study and invite the staff to participate.
- Once approval is obtained from the nurse managers and directors, the staff will be informed about the project during a staff meeting in which the investigator presents the EBP project.
- The nursing staff will have the option to participate or not to participate in the study.

PROCEDURES

- Participants will be provided with an information sheet explaining the project and training sessions that will be available for each shift.
- Participants will take an initial (first) survey type questionnaire that will assess their knowledge about the prevention of back pain and injuries.
- The first survey will include 10 questions to gather background demographics and knowledge base of lifting techniques, and LNE.
- The intervention will include a 15-minute training session, educational booklet, a policy, and a video on appropriate lifting techniques and LNE.
- The nurses' champions and staff will receive training from the IEP student. The nurse champions will act as an expert and advocate on each unit as it relates to the prevention of back pain and injuries in nurses.
- Following the intervention, the second survey will be administered to the subjects and will include the same 10 multiple choice questions as the first survey to assess their knowledge following the intervention.
Implementation

- Implementing EBP in an organization can be broken down into a 5-step process that includes:
  - Developing a clear and focused question.
  - Searching for the evidence.
  - Critically appraising the evidence.
  - Implementing best practice recommendations. (Smith & Donitz, 2010)
  - Evaluating practice recommendations. (Smith & Donitz, 2010)
- Key factors can determine if an organization is ready for changes in the healthcare environment.
- Each organization is unique and it is important that practitioners, who are implementing EBP into their own organization, understand the environmental readiness as it pertains to their own institution.
- They need to assess if their current healthcare environment is ready to respond to change (Smith & Donitz, 2010). Identifying the obstacles is necessary before change can occur.

Sustaining EBP

- For EBP to be sustained, it must be made integral part of the organizational culture.
- The organization must be committed to making the EBP work in the institution by developing the right infrastructure and resources to support it.
- Leadership must be supportive and take action and not just speak the words that EBP must be done (Smith & Donitz, 2010).
- Educating the staff about the EBP process and its relationship to the delivery of quality patient care is important.
- Developing an EBP framework and team composed of nursing staff, clinical leaders, and clinical nurse specialists (DNS) will facilitate the EBP process and engages the staff to participate and achieve excellence in nursing and patient care (Marshall, 2006).

References


APPENDIX B: EDUCATION BOOKLET
BACK PAIN AND INJURIES:

A PREVENTION GUIDE FOR

HEALTHCARE PROVIDERS

ABOUT THIS GUIDE

This booklet has been designed as part of an Evidence Based Practice Project. It is intended to provide general guidance for healthcare employees about how to prevent back injuries and pain as a result of lifting and moving patients.

BACKGROUND INFORMATION

Work-related musculoskeletal disorders continue to be the leading occupational health problem among nurses.³
During 2011, healthcare workers suffered a higher rate of musculoskeletal disorders (MSD) than construction, mining, or manufacturing workers.¹

Back injuries in nurses are largely due to patient handling – the lifting and transfer of patients. Patient factors such as weight and immobility contribute to the risk of injury. Organizational factors such as the lack of mechanical lifting equipment, personnel to assist with lifting, and education and policies to prevent back injuries further compound the problem.³

Ergonomics is the scientific study of the relation between people and their occupation. It can help reduce and prevent back pain and injuries in healthcare providers. The goal of patient care ergonomics is to help the healthcare provider feel and work better.⁶

**INITIATIVES & INTERVENTIONS**

The ANA launched a campaign in 2003 and released a position statement to eliminate manual patient handling to prevent back and other musculoskeletal injuries. The focus of the “Handle with Care” campaign is to educate, advocate and facilitate change from a traditional practice of manual patient handling to emerging technology methods that would lessen the physical demands on nurses.³
The overall goal of the campaign was to improve the quality of nursing care while reducing the incidence of musculoskeletal injuries. In 2008, ANA updated the position statement for a safer work environment by establishing actions and policies that result in the elimination of manual patient handling.

Research has shown that manual handling is unsafe in almost every situation and that safe patient handling and movement (SPHM) technology must be used to lift, transfer, and reposition patients in effort to keep patients as well as nurses safe.

SPHM programs can reduce healthcare work-related injuries and MSD if they are properly implemented.

SPHM is defined as the use of engineering controls, mechanical lifting equipment and patient handling aids in accordance with guidelines of care developed in effort to minimize caregiver manual lifting in circumstances that may be unsafe for staff or patients. Although many healthcare organizations have SPHM policies, they have not been unable to sustain them or implement them successfully. In 2013, only ten states had enacted laws related to the implementation of SPHM policies.
Evidence indicates that this is due to lack of support from nursing management, bulky mechanical lift equipment, heavy equipment, time-consuming to use the equipment, lack of education on how to use the equipment, and culture. Safe patient handling can enhance the overall quality of patient care and improve outcomes.4

WHAT CONTRIBUTES TO BACK PAIN & INJURIES IN HEALTHCARE WORKERS?

Lifting fragile human beings is very different than lifting an object. The human body is heavy and awkward to handle. Patients may have IVs, monitoring devices, or be heavily medicated, which further complicates lifting or moving the patient.2

Patients can have psychological or medical conditions that may also complicate lifting or moving them. For example, a patient with dementia may move suddenly out of fear or a patient may have pain and shout out with the discomfort. The nurse could be distracted by this. It is difficult to predict the response of the patient in every setting and situation.2

Fatigue, repeated bending, twisting, reaching, or holding a prolonged fixed position like standing for long periods or feeding a patient may increase the risk of injury or back pain. Bending, reaching out to lift, and twisting are one of the most damaging activities for healthcare workers. The ligaments of the back cannot support twisting movements very well. This type of activity
puts pressure on the discs in the lower back and the center of the nucleus of the disc is forced backward.²

Risks associated with patient handling and movements are magnified when a patient is morbidly obese. The healthcare provider should assess body mass index (BMI), weight distribution, and cognitive status, ability to bear weight, pain levels, respiratory status, endurance, and complexity of injury. A bariatric patient is a morbidly obese patient with a BMI greater than 30. An accurate assessment of bariatric patients is an important factor in preventing injuries in healthcare providers.⁶

There are many high risk activities involved in lifting a patient. Changes in a patient status may change throughout an admission and require and the patient may require a different level of care. Therefore, assessment of the patient by patient care staff should be done at admission and continue to be ongoing during a patient’s stay⁶
High risk activities include, but are not limited to the following:

Manual lifting

Force

Heavy loads

Laterally transferring between two horizontal surfaces

Ambulating

Repositioning in bed or chairs

Manipulating extremities

Transporting patients and equipment

Performing activities of daily living

Stopping falls or transfers from the floor

Sustaining awkward position

Examples of awkward posture:

Attaching gait belt or transfer belts with handles

Providing In-Bed medical care while reaching (e.g. bed rails up and bed too low while you care for patient)
Washing patient’s feet while in a shower chair (e.g. bending and twisting)

Repositioning or turning patients in bed (e.g. reaching and twisting while side rails up and bed is too low)

Performing stand-pivot transfers (e.g. wheelchair may be too far from the bed).²

IDENTIFYING SOLUTIONS TO DECREASING BACK PAIN & INJURIES

Education on lifting techniques and training in body mechanics are not effective in reducing injuries in nurses when used alone. The use of mechanical lifts may minimize the risk of injury, but does not eliminate the risks involved in manual lifting.⁶

The use of multifaceted interventions is more effective for disseminating evidence are more likely to produce change than a single intervention such as education.⁵ Multifaceted approaches include administrative controls (institutional “no lift” policy), behavioral controls (nurse champions or peer coach programs), education, and engineering controls (minimal lift equipment).
ASSIST EQUIPMENT & DEVICES

There are many types of equipment and devices that have been designed to make lifting and moving a patient easier. It is important to note that inappropriate use of body mechanics can lead to injury.

LIFTING

Manual lifting is a high risk activity for the patient and the healthcare provider. Mechanical lifting equipment (MLE) helps reduce injury by avoiding unnecessary manual transfers, awkward postures, forceful exertions and repetitive motions. Barriers may prevent healthcare providers from using MLE because of time or lack of knowledge in appropriate use. MLE can actually save time for staff by reducing the number of employees needed on a given transfer.
TRANSFER BOARDS

- A transfer board is a board between two horizontal surfaces that a patient slides across.
- They may be uncomfortable for very large patients
- They may be unstable for very large patients

HOVERMATT

- Used to transfer patient
- Air-assisted technology improves patient and caregiver safety and comfort during transfers
- Inflated mattress moves patient in stable position, reducing skin shear and bruising
- Single use white Hovermatt is disposed of once patient is discharged

MOBILE LIFT

- Offers a smooth lift for the most common lifting needs
- Designed for bariatric patients weighing up to 660 lbs. (sling sizes vary according to patient weight) (Model XS and S @ 350 lbs., M @ 450 lbs., L @ 550 lbs.).
• Utilized for lifting from the bed, floor, to/from the toilet, ambulation and horizontal lifts.
• Requires the presence of two staff members at all times.

SIT TO STAND LIFT

• Designed to assist caregivers in raising weight-bearing patients to a standing position without the need for manual lifting. Manual lifting.
• Weight guidance applies to most body types

CEILING LIFTS

• Used for lifting and moving patients from one place to another in different care environments.
References


APPENDIX C: QUESTIONNAIRE

My name is Lisa Berge. I am a nurse practitioner and a doctoral student. The following questionnaire is for my Evidence-Based Project to complete the requirements for a Doctor of Nursing Practice degree at The Catholic University of America. It will take approximately 15 minutes to complete. My project addresses the effect of the multifaceted intervention upon nurses’ knowledge about occupational back pain and prevention, use of patient handling techniques, use of minimal lift equipment, and institutional compliance expectations. The intervention involves reviewing the no lift policy, viewing a short instructional video (<10 minutes), and reading an educational booklet. These activities are estimated to require approximately 1.5 hours in total. You will also have access to peer coaches on day and evening shifts to assist you. Peer coaches will provide leadership, enthusiasm, facilitate knowledge transfer on the program elements and equipment, and act as unit experts. The peer coaches will champion the project on each unit. Your participation in this project is voluntary. You may choose to withdraw at any time throughout the study.

Participation in this project will also involve your completing two short (<15 minute) questionnaires. The first questionnaire will be completed when the project starts. The second will be completed six weeks later. There are three sections to the questionnaire: demographic
information, your back injury history and your comfort level with minimal lift equipment, and assessment of your knowledge.

All responses will be kept confidential and your responses are anonymous. Those with the right to look at the records include The Catholic University of America IRB and hospital IRB. The completion of this questionnaire implies your consent to participate. If you choose to participate, please complete the attached questionnaire and return it to your nursing supervisor within one week of receiving the questionnaire. If you choose to obtain a $10 Target gift card as a thank you for participation, please contact Lisa Berge (project leader) by email at lisaberge92@gmail.com. Your email address will be retained until the data analyses of the study are completed. Then your email will be deleted and any paper records will be destroyed. You will receive the gift card through interoffice mail that will be sent by the investigator. Although the investigator will be aware of your participation by claiming the gift card, your questionnaire information will remain anonymous. The gift card is optional and you are not required to receive in order to participate in the project.

Thank you for your time. Please note the INSTRUCTIONS in each section.
Section 1: Please complete the following seven demographic questions. Thank You!

What is your age? _______

What is your Gender? _______

What is your ethnicity?

- White
- Black or African American
- Asian/Pacific Islander
- Hispanic or Latino
- Native American
- Middle Eastern
- Other ____________________

Which of the following categories best describes your employment status?

- Employed, working full-time on one unit
- Employed, working full-time as float nurse
- Employed, working part-time on one unit
- Employed, working part-time as float nurse
- Per Diem on one unit
- Per Diem, float nurse
- Contract nurse/travel nurse
- Other ________________

What is the highest level of education you have completed?

- High School diploma or equivalent (e.g., GED)
- Some college but no degree
- Associates degree
- Professional degree
- Bachelor degree
Which of the following best describes your current occupation?

- Graduate degree
- Doctorate degree
- Certificate ________________

Which of the following best describes your current occupation?

- Licensed Nursing Assistant (LNA)
- Licensed Practical Nurse (LPN)
- Registered Nurse (RN)
- Advanced Practice Registered Nurse (APRN)
- Other ________________

How many years of experience do you have in providing bedside nursing?

__________ years ___________ months (if < 1 year)

Section 2: Please complete the following five questions regarding your back injury history and comfort level using minimal lift equipment. Thank You!

Have you experienced a back injury while working as a nurse at any point in your career while lifting, transferring, or boosting a patient?

- Yes
- No

If you answered yes to the above question, did you report your injury to your supervisor?

- Yes
- No
Do you feel comfortable using minimal lift equipment that is available on your unit to lift patients?

- Never
- Rarely
- Sometimes
- Often
- Always

Do you feel comfortable using minimal lift equipment with your colleagues to safely lift or transfer a patient?

- Never
- Rarely
- Sometimes
- Often
- Always

Are you satisfied with the training you have received in your current position on body mechanics and the use of minimal lift equipment to safely lift or transfer a patient?

- Not at all satisfied
- Slightly satisfied
- Moderately Satisfied
- Very Satisfied
- Extremely Satisfied

Please answer the following 2 question following the intervention only (i.e. the second time you complete the questionnaire).

How many times did you access the minimal lift equipment video to review? ________
Did you find the video helpful in guiding you to use minimal lift equipment? Yes___No___.

Please explain____________________________________________________

Section 3: Please complete the following 12 multiple choice assessments questions. Thank You!

If you had to transfer a totally dependent patient from a bed to a chair at a different height, what is the best step you could take to reduce musculoskeletal risk factors?

- a. Use Mobile Lift Equipment* (* indicates the correct answer)
- b. Assist patient to sitting position before a standing position and then pivot patient to chair
- c. Coach the patient to make the transfer unaided
- d. Use Hovermatt to transfer the patient

The goal of patient care ergonomics is to

- a. Slow down your work to use appropriate lifting techniques
- b. Help you feel and work better*
- c. Increase workload and safety
- d. Make patients recover faster

While bending forward, you spend 30 minutes feeding a patient on bed rest. What is (are) the musculoskeletal risk factor(s) in this situation?

- a. Pushing/Pulling
- b. Awkward posture
- c. Long duration
- d. Heavy lifting
Technologies to assist with vertical transfers of patients include:

- a. Powered full bodied sling lift, floor-based sling lifts, and ceiling mounted patient lifts
- b. Non-powered standing aids and gait transfer belts
- c. Powered full bodies sling lifts, floor-based sling lifts, non-powered standing aids and gait belts, ceiling mounted patient lifts*
- d. None of the above

Technologies to assist with lateral transfer and repositioning of patients include:

- b. Air assisted systems, friction reducing devices, mechanical lateral transfer aides, sliding boards, and transfer chairs*
- c. Air assisted systems, friction reducing devices, mechanical lateral transfer aides, sliding board, transfer chairs, non-powered standing aids
- Both A and C

The following are high risk tasks that can push the limits of human capabilities:

- a. Heavy loads, sustained awkward positions, bending and twisting, charting while standing, stress and fatigue
- b. Walking, heavy loads, awkward positions, charting while standing, bending and twisting, reaching, fatigue, standing for long periods
- c. Heavy loads, sustained awkward position, bending and twisting, reaching, fatigue, standing for long periods, reaching, and force*
Risks associated with patient handling and movements are magnified when a patient is morbidly obese. A bariatric patient is which of the following?

- a. A morbidly obese patient with a body mass index (BMI) greater than 35
- b. A morbidly obese patient with a body mass index (BMI) greater than 30*
- c. A morbidly obese patient with a body mass index (BMI) greater than 28
- d. A morbidly obese patient with a body mass index (BMI) greater than 40

Education alone on lifting techniques and training in body mechanics are effective in reducing injuries in nurses.

- a. True
- b. False*

While caring for a patient, a family member of the patient in the next bed asks if you could just take a moment to help her boost her family member up in the bed. What is the appropriate step?

- a. Assist the family member in boosting the patient as he is not a bariatric patient and requires assistance
- b. Inform the family member you will step out to request help by a staff member
- c. Inform the family member you will step out to request help by a staff member and return with approved aids for patient handling*
- d. Inform the family member that you will get the patient's RN or LNA

Safe Patient Handling and Movement is defined as:

- The use of lifting equipment, mechanical lifts, and manual lifting to avoid patient and staff injuries.
- The use of engineering controls, mechanical lifting equipment and patient handling aids in accordance with guidelines of care developed in effort to minimize caregiver manual lifting in circumstances that may be unsafe for staff and or patients and to eliminate legal actions for the institution.
The use of engineering controls, mechanical lifting equipment and patient handling aids in accordance with guidelines of care developed in effort to minimize caregiver manual lifting in circumstances that may be unsafe for staff and or patients.*

Assessment of the patient by patient care staff should be done to determine the level of care required for safe patient handling and movement:

- a. Upon admission
- b. Upon admission and every 12 hours
- c. Upon admission and ongoing during the patient's hospital stay*
- d. Only once upon admission unless there is a mental status change in the patient or the patient has fallen

Handling patients with severe pain requires careful attention. The goals of safe patient handling with this patient include safety to the patient and caregiver, as well as minimizing pain. Severe pain in patients may contribute to staff injuries for the following reasons:

- a. There may be decreased patient cooperation and participation by the patient
- b. The patient may move unexpectedly due to severe pain or fear
- c. The healthcare provider may be distracted by the patient's expression of pain
- d. All of the above*

THANK YOU FOR YOUR ASSISTANCE
ARE YOU INTERESTED IN PREVENTING BACK INJURIES IN NURSES?

INVITATION TO PARTICIPATE IN AN Evidence Based Project

My name is Dr. Lisa Berge. I am a doctoral student at Catholic University and a Nurse Practitioner in Business and Health. Preventing back injuries in nurses is one of my goals. Therefore, as part of my fulfillment for my Doctorate in Nursing Practice at Catholic University, I am conducting a quality improvement project using a multifaceted intervention program to prevent back pain and injuries in nurses. A brief description is listed below. Participation is voluntary and your identity will remain anonymous throughout the entire project, data collection, and data analysis. If you do decide to participate, you will receive an optional $10 Target Gift Card as a thank you for participation. You can contact your Nurse Manager or Director directly to pick up a questionnaire. You may contact me with any questions. My contact information is listed below.

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PURPOSE

The purpose of this project is to determine the effect of the multifaceted intervention upon nurses’ knowledge about occupational back pain and prevention, use of patient handling techniques, use of minimal lift equipment, peer coaches, and institutional compliance expectations.

DESCRIPTION OF THE PROCEDURES

The program will consist of a pre-test/post-test to assess knowledge in nurses regarding lifting techniques, ergonomics, minimal lift equipment (MLE), anatomy, and injury risk. The program elements include an educational booklet (handout); online instructional video illustrating appropriate instruction and use of MLE, peer coach, and a written no lift policy.