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How Proactive Measures Reduce Patient Handling Injuries Among Healthcare Workers In A Hospital Setting: A Systematic Review To Determine Best Practice

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HOW PROACTIVE MEASURES REDUCE PATIENT HANDLING INJURIES AMONG HEALTHCARE WORKERS IN A HOSPITAL SETTING: A SYSTEMATIC REVIEW TO DETERMINE BEST PRACTICE

by

Kimberly A. Jefferson

A Master's Thesis Presented in Partial Fulfillment

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A systematic review to determine best practice

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Abstract

The purpose of this study is to determine the best proactive measures in a hospital setting to reduce patient handling injuries among healthcare workers. Improper patient handling techniques have been found to be a major cause of workplace injuries among health care workers in the hospital setting. A systematic review was performed to assess programs that have implemented various methods of improving patient handling techniques. There are numerous programs or components that were found to be successful in reducing patient handling injuries. Among these program components are lift teams, lifting equipment, ceiling lifts, education, training and an active multidisciplinary team. The costs to the organization resulting from lost work days, workers compensation claims, turnover and modified duty days was found to be decreased in those organizations that have implemented a safe patient handling program.

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Chapter 1: Introduction

According to a Bureau of Labor Statistics (BLS) report in 2005, health care providers had the second largest percentage (16 percent) of work related injuries. Patient handling related injuries are among the highest rates due to lost time injuries in all professions according to the BLS, more specifically back injuries are the most costly occupational problems. Health care workers often experience injuries at a rate faster than those workers in mining, construction and manufacturing (Bell, Collins, Galinsky, & Waters, 2008). The injuries are compounded by the fact that the weight of patients requiring assistance with lifting is increasing because of the obesity epidemic in the United States (Ogden, Carroll & Curtin, 2006). The American Nurses Association's (ANA) *Handle with Care* campaign reported that 38% of workers compensation expenditures and 12% of registered nurse (RN) turnover are related to back strain (American Nurses Association, 2009).

Background of the Study

History

According to a technical report published in the Occupational Safety & Health Administration (OSHA) web site, many back disorders were found to be cumulative in nature. While many times a single incident of a improper lifting technique can't be isolated, it is the cumulative effect of repetitive activity over years that may eventually cause injury and possibly disabling an individual (Occupational Safety & Health Administration, n.d.). The injury may cause a significant amount of suffering, productivity loss and a burden economically on the compensation system. Nurses may eventually leave nursing because the injury, either episodic

or cumulative in nature places nurses in a position where they can no longer safely care for patients.

OSHA does not have standard weight limit on how much a person may lift or carry, National Institute for Occupational Safety and Health (NIOSH) does have recommendations (Fairfax, 2004). NIOSH has developed a mathematical model which helps predict the risk of injury depending on how much weight is being lifting. This equation is based on tasks, and since many tasks have too many variables involved this equation may be too difficult to interpret. The equation is used to calculate a recommended weight limit, which under normal condition is 51 pounds, or "load constant". Therefore the maximum weight to be lifted under perfect conditions is 51 pounds and anything above that should not be lifted without assistive devices (NIOSH, 2007). There is evidence that a weight limit of 35 pounds is more reasonable, since it is believed that the 51 pound restriction does not include variables that are associated with patient handling. The variables include patients' unpredictability, such as muscle spasms and resisting, as well as being heavier than what they appear (Waters T., 2007).

In 2004, when the most recent National Sample Survey of Registered Nurses was conducted, employment in nursing rose to more than 83 percent of registered nurses with active licenses, the highest since 1980. In spite of this, according to the Health Resources and Services Administration, Bureau of Health Professionals (HRSA, BHR), a growing shortage of registered nurses has been projected over the next 15 years, a 12 percent shortage by 2010 and a 20 percent shortage by the year 2015. The average age of RNs has climbed to 46.8 years, the highest average age since the first comparable report was published in 1980, and is expected to be

approximately 50 years of age by the year 2010 (US Department of Health and Human Resources, 2009).

According to the Administration on Aging, it is predicted that by the year 2030, the percent of older persons will be approximately 20 percent of the total US population, an increase from 12.4 percent in the year 2000 (Administration on Aging, 2009). Aging fits into the topic of pateint handling injuries by recognizing that the increasing injury rates along with a critical shortage in the nursing workforce, there will not be enough healthcare workers to care for our nations growing aging population (Collins, Wolf, Bell & Evanoff, 2004).

It is estimated that over 52 percent of the nursing workforce suffers from chronic backpain, largely a result of repetive movement over time. This couples with the fact of extended work schedules, work pace increasing, and the aging nursing workforce (Nursing World, 2010). In the face of a nursing shortage, an aging nursing workforce, and an overall aging population, it is critical that we preserve the health of our nursing staff by reducing patient handling related injuries in healthcare personnel (Bell et al., 2008).

Current Legislation

ANA is working with state and federal agencies to enact safe patient handling legislation. The first state to enact was in the year 2005 with several more in the year 2009 (See Appendix A). The following states have introduced similar bills that would require hospitals to create a committee charged with developing a safe patient handling and movement program coupled with practices and policies, Last Updated: 10/28/10 **(**ANA, 2010)**.**

- **CA**– (AB 1994) although not safe patient handling per se, but workers comp bill to extend definition of injury to include "neck or back impairment". *(session ends 8/31/10)*

- **MA–**has several bills with varying approaches, including a Senate version (SB 1757) that would require a hospital committee to address;
  (HB 2026/SB 803) creates a program with a committee within nursing homes that apply minimum standards obtained from OSHA nursing home guidelines, VA patient care standards or other similar, also includes use of lift teams;<(SB 876) is a comprehensive safety bill that addresses safe staffing, mandatory overtime and patient handling; requires the department of public health to develop guidelines for every licensed health care facility based on ergonomic standards and in an effort to reduce manual lifting associated injury rates. (*session ends 1/4/11)*
- **MI** - (SB 193) requires a SPH committee/ associated policy; two other bills (SB 93/HB 4154) are less explicit. *(session ends 12/31/10)*
- **NY** - three approaches: one of which is to extend the two year demonstration project, first enacted in 2005 (SB 5006/AB 8045) which was enacted again in 2009; one seeking a statewide safe patient handling task force to study this topic (AB 2047/SB 3839); and lastly a bill that requires installation of ceiling lifts in hospitals and nursing homes (AB 1723/SB 317). *(session ends 1/5/11)*
- **Those no longer active, killed in committee or died at the conclusion of the session...**
- **FL** - (HB231/SB 626) required hospitals to establish a safe patient handling committee to create and implement related policy.
- **HI –**(HB 440/SB 519) requires private and community hospitals to establish a safe patient handling committee.
- **MN** - (HB 921/SB 594) requires hospitals to establish plans to address safe patient handling with periodic evaluation; does not mention a committee approach.
- **MO –**requires a safe patient handling program, includes reference to lift teams. One of the two bills also includes tax credits for hospitals (HB 1307) to purchase equipment. One of the bills also establishes a required ratio for the number of lifts per set number of patients. (SB 866)
- **TX** - extended safe patient handling policies to select hospitals (HB 2597/SB 1990)
- **VT** - (HB 238) requires a program within hospitals and nursing homes.

Statement of the Problem

Over the past three decades, there have been interventions identified that assist in the reduction of patient handling related injuries, but these techniques are not being incorporated into healthcare settings. The reasons they are not being incorporated range from old theories being taught in nursing school to the upfront cost of patient lifting equipment. Consequences of the improper use of these techniques, as well as the lack of implementation have led nurses to career ending injuries and fear of future injuries (Nelson, Waters, Menzel, Hughes, Hagan & Powell-

Cope, 2007). National Association of Orthopaedic Nurses, (NAON) took a postion that in order to preserve nursing at the bedside, these techniques must be used, and must be used properly (Sedlak, Doheny, Nelson, & Waters, 2009).

While ANA launched its *Handle with Care* campaign in 2003, the National Association of Orthopaedic Nurses (NAON) began to work closely with the ANA's Patient Safety Center of Inquiry at the James A. Haley Veterans Administration Medical Center and the National Institute for Occupational Safety and Health (NIOSH). The purpose was to identify high risk patient related tasks requiring the movement of patients. This task force was built upon the same guidelines that the above organizations developed with the Association of Perioperative Registered Nurses (Waters, Collins, Galinsky, & Caruso, 2006).

Purpose of the Study

The purpose of this study is to determine what the best proactive measures are that will reduce patient handling injuries among healthcare workers in a hospital setting.

Research Question

The research addresses the question of "What are the best proactive measures to be utilized in order to prevent patient handling related injuries among healthcare workers in the hospital setting?" It is increasingly clear from the research that has been published to date, that there are some proactive measures which reduce the rates of patient handling related injuries.

This paper was a systematic review of the existing body of research, assessing the quality of the studies done, synthesizing the findings of the studies, and taking the first steps in developing standardized, evidence based patient handling protocols.

Significance of the Study

This is an important topic of research for organizations and administration because of the loss of productivity and high cost of turnover. Preventing health care professionals from leaving bedside nursing and eventually an institution is critical and needs attention. By being proactive, the organization communicates to the health care professional that it cares about the professional's safety and well being, thus improving staff satisfaction. Being proactive may also lead to reducing patient related injuries and, by reducing injuries especially in a time of an RN shortage, may ultimately affect the fiscal health of the organization (Morgan & Chow, 2007).

Direct and indirect back injury costs are estimated to be cost about $20 billion annually according to NIOSH. Costs that are associated with occupational injuries are often more than most realize and as workers injuries decline, both direct and indirect costs associated with these injuries decrease (Bell et al., 2008). Examples of direct costs are: capital costs; medical care for injured employees; workers compensation payments; sick leave; employee counseling; and OSHA reporting compliance. Indirect costs include: productivity loss; pain and suffering for both the employee and the patient; employee morale; patient care and satisfaction; and proceeds lost by foregoing other opportunities. Administrators need to be educated on the fact that there is an undeniable financial case in patient care ergonomic interventions. Other than benefitting the employee and meeting government regulations, such interventions have a substantial impact on the bottom line of the organization. Cost benefit analyses have shown that assistive patient handling devices and equipment effectively reduces workers' compensation and medical management costs for patient related handling injuries (Siddbarthan, Nelson, & Weisenborn, 2005).

There are connections between nursing injury rates and patient outcomes, both direct and indirect. It is known that nursing staff injuries influence staffing ratios, which influence patient outcomes, therefore it can be said that nursing staff injuries influence patient outcomes. More resources and energy must be allotted to enhancing working conditions, building a culture of safety and reducing the physical demands of the job in order to positively impact patient outcomes. Nursing injury rates are directly related to the number of nursing hours at the bedside, a major reason that nurses leave the bedside, and are directly connected to the national nursing shortage. Nursing injury rates yield negative patient outcomes when all of the above are combined (Charney & Schirmer, 2007). Core Measures, which track a variety of evidence-based, scientifically-researched standards of care have been shown to result in improved clinical outcomes for patients. It would be advantageous for health care organizations to improve patient outcomes since the bottom line depends on this and how the organization will be reimbursed, based on their Core Measure data. This can also be linked to overall patient satisfaction and the patient's likelihood to return.

Cost estimates of turnover for an RN vary, anywhere from $25,450 - $38,280, (Morgan et al., 2007); to $62,100 to $67,100 (Bland Jones, 2005); to approximately $300,000 for every 1% increase in turnover (Bland Jones, 2008). Savings are viewed as a function of eliminating indirect costs such as time for investigation, loss of productivity, replacement of injured employees (turnover), lost work days, modified duty time, liability costs from possible patient injury overtime pay to those covering shifts and workload, education and training of new employees and other operational costs.

Employers have saved tens to hundreds of thousand dollars after implementing a safe patient handling program and reduced illness from work (Siddbarthan et al., 2005). Over the six years that the safe patient handling efforts have been in effect, Tampa General Hospital (TGH) has seen an RN injury rate decrease from 4.35 per 100 RNs down to 0.77 per 100 RNs, a reduction of 82%. The hospital was able to decrease the overall workers compensation cost as a percentage of total payroll from 1.03% in 2000 to 0.03% in 2007, compared to the national average which is 1.39% (Kutash, Short, Shea, & Martinez, 2009).

NIOSH has a wide-ranging research program to prevent patient handling related injuries by reducing lifting injuries in healthcare settings as one of the major efforts. NIOSH's research with diverse partners has already made strides in developing and implementing practical intervention strategies, with further progress expected (Bell et al., 2008).

Beginning in 2009, NIOSH will conduct a project aimed at improving safety while lifting and moving bariatric patients. In healthcare settings, the term "bariatric" is used to refer to patients whose weights exceed the safety capacity of standard patient lifting equipment (300 lbs), or who otherwise have limitations in health, mobility, or environmental access due to their weight/size. Compared to the non-obese population, obese individuals require more frequent and extensive healthcare due to obesity-related health problems, and healthcare personnel are encountering hospitalized and critical-care bariatric patients on an increasingly frequent basis. The upcoming NIOSH project will evaluate bariatric patient handling practices at multiple hospitals, including intervention programs and health/safety outcomes, in order to identify and promote evidence-based best practices (Bell et al., 2008).

Nurses are leaving nursing for many reasons. At the top of many lists appears to be the physical stress of the job, work environment layout and design, staffing inadequacy and increased patient loads which often lead to musculoskeletal injuries (Summer & Townsend-Roccbiccoli, 2003). In the face of a nursing shortage, aging nursing workforce and an aging population it is critical that we preserve the health of our nursing staff by reducing patient handling related injuries in healthcare personnel (Bell et al., 2008).

Definition of Terms

Assistive Devices: Variety of implements or equipment used to aid patients/clients in performing movements, tasks, or activities and may include crutches, canes, walkers, wheelchairs, power devices, long-handled reachers, and static and dynamic splints (World Confederation for Physical Therapy, 2009). (For this study, the term includes bedside lifts, ceiling lifts, and hover mats).

Bedside Lifts: Mechanical lift that is used to transfer patients from bed to chair, and back to bed, aka Hoyer Lift (Handicapped Equipment, 2010).

Ceiling Lifts: A ceiling lift system is installed with tracks that are mounted into the overhead beams to support the weight of the patient. A battery-powered lifting motor unit is attached to the track. The motor unit raises and lowers the patient and can be moved along the track (Weinel, 2008).

Direct Costs: Expense that can be traced directly to (or identified with) a specific cost center or cost object such as a department, process, or product (Business Dictionary, 2010).

Ergonomics: Ergonomics is the science of fitting workplace conditions and job demands to the capabilities of the working population (Occupational Safety & Health Adminstration, 2007).

Hover Mats: Inflatable mat, lateral transfer and positioning device that can transfer a patient on a cushion of air (USA Tech Guide, n.d.).

Indirect Costs: Expenses (such as for advertising, computing, maintenance, security, supervision) incurred in joint usage and, therefore, difficult to assign to or identify with a specific cost object or cost center (department, function, program) (Business Dictionary, 2010).

Patient Handling injuries: Those injuries that occur while moving and/or transporting patients (American Nurses Association, 2009).

Safe Patient Handling (SPH): is the term referring to policies and programs that enable nurses to move patients in a way that does not cause strain or injury (ANA Safe Patient Handling, 2010)

Organization of the Remainder of the Study

The following chapters will address the purpose, search strategy, levels of research, and grading of the studies. Papers that meet the inclusion criteria will be summarized within a Table and will be reported in the results section of the paper. Following the summary, recommendations for implementation will be addressed in the conclusion section.

Chapter 2: Method

Purpose/Question

Patient handling related injuries have a huge impact on organizations as they relate to lost work days, workers compensation dollars, and turnover costs among registered nurses eventually leaving bedside nursing. The purpose of this study was to determine the best proactive measures in a hospital setting can do to reduce patient handling injuries among healthcare workers. The question that will be addressed by this project is: "What are the best proactive measures to reduce patient handling injuries in the hospital setting among healthcare workers?"

Research Methodology

A systematic literature review was conducted for this study. A systematic review is a means of reviewing a research question that has been clearly formulated by using a precise methodology to blend existing studies of research evidence and minimize bias in location, selection, and critical evaluation. It is also used to accurately assess the scholarly literature, summarize the information in the literature, and use the information gathered to formulate guidelines and clinical strategies (Denyer, 2009).

Systematic reviews are done for many reasons, one being to identify any gaps in the current research and to suggest areas for future investigation and another to provide a framework in order to position new research activities. One of the questions that needs to be asked is "How does the current practice differ from what the evidence says?" This is extremely important when conducting a systematic review. In healthcare it is mandatory that practicing medicine is not based on perceptions and feelings, but instead utilizing solid evidence and science to develop or change a particular guideline or protocol.

Search Strategy

The review started with a predefined search strategy in order to be fair and unbiased. Every effort to identify and report research that does and does not support the preferred research question was utilized.

Databases that were searched for appropriate articles using the following search terms: injur*, patient handling, nurs*, hospital and lift*. Databases included Academic Search Premier, Business Source Premier, CINAHL, Cochrane Library, ERIC, MEDLINE, PsycINFO and SportDISCUS. Additionally Bureau of Labor Statistics, National Institute for Occupational Safety and Health, (NIOSH), National Association of Orthopedic Nurses, (NAON) and the American Nurses Association (ANA) sites were searched. All attempts were made in order to be as consistent as possible with the search terms being used. All sound studies were analyzed regardless of the method used.

Inclusion Criteria:

1. Studies that assessed prevention protocols or programs for effectiveness of the reduction of patient handling injuries in nurses.
    a. Programs that were performed in the acute care setting.
    b. No time frame was excluded, although literature searched for works published from January 2003 until August 2010.
2. Any program or article that is patient related injury or patient related
3. Outcomes: Studies that reduce patient handling injuries.
4. Studies that included an abstract, with full text articles.
5. Studies included for consideration were those of the adolescent and adult population.

Exclusion Criteria:

1. Studies that focused on infant and pediatric cases.
2. Studies not published in English and prior to 2003
3. Full text articles not available through the Regis library system and its affiliates including Loan Ranger, and not available through the internet;
4. Ergonomics and injuries not related to musculoskeletal handling of patients

Grading of Studies:

In a systematic review, articles are reviewed for level of evidence and graded on the basis of rigorous to weak. Levels of evidence are assigned to studies in a methodical manner based on the quality of their design, validity, and applicability to patient care. These decisions give the grade (or strength) of recommendation. Level I is the strongest evidence and Level IV is the weakest. The grading system for the systematic review is based on an adaptation from Stetler et. al (Oman, Duran & Fink, 2008). Table I summarizes these levels:

Table 1
Levels of Evidence: Adaptation of Stetler et. al

Level I: strongest evidence	Meta-analysis or systematic review of multiple controlled studies or clinical trials
Level II	Individual experimental studies with randomization
Level III	Quasi-experimental studies such as nonrandomized controlled single-group pre-post, cohort, time series, or matched case-controlled studies
Level IV	Nonexperimental studies, such as comparative and co relational descriptive research as well as qualitative studies
Level V	Program evaluation, research utilization, quality improvement projects, case reports (JCAHO Sentinel Event Reports) or benchmarking studies (NDNQI reports)
Level VI: weakest evidence	Opinions of respected authorities; or the opinions of expert committee, including their interpretation of non-research-based information. This includes textbooks and clinical product guidelines.

Recommendations/Grading:

The quality for any level can range from A-D and this reflects the basic scientific-credibility of the overall study. An A reflects a very well designed study, while a D reflects a study that has major flaws and raises serious questions about the findings. A quality rating of D would automatically be eliminated from consideration.

All levels were confirmed by a second reader and there were not any discrepant cases that went to a third reader to review.

Sample Size:

Sample size was determined by the available data in the published time frame that has been established by the search options. Saturation of data was presumed after latter data searches yielded several duplicate articles.

Chapter 3: RESULTS

The literature reviewed produced a total of 99 articles. "Hospital" was added as a search term, closest to acute care setting and the search produced 31 articles. There were 23 articles that met the inclusion criteria established. Out of the eight articles that were removed, three of them were pediatric setting, four were information only and one was a repeat.

Articles that met the established criteria were assigned a research level according to the adaptation Levels of Evidence of Stetler et al, (Oman, 2008). This system assigns a Level 1 (strongest support) to Meta-analysis or systematic review of multiple controlled studies or clinical trials and Level II to individual experimental studies with randomization (See table 1). .

Many of the articles, nine out of 23 showed a decrease in both injury rates and costs to the organization while two out of the 23 showed decrease in cost and one showed a decrease in injury rates. There were two articles that showed a decrease in cost and one in injury rates, so it is a possibility that this could have been because the researchers of the studies were only looking at those specific outcome measures. There were three articles that described equipment compliance as an outcome and one described training as reducing the load on the back and injury risk.

The most promising studies described combinations of training, education, ergonomic equipment and lift teams to decrease patient handling injuries and employee incidents. Successful components included:

- Lift teams
- Employee Health or occupational health department
- Portable equipment
- Disposable/reusable support supplies

- Readily available equipment
- Health education program
- Integration of mounted ceiling lifts
- Development of safe patient handling policies
- Use of an interdisciplinary team
- Lifting anything over 51 pounds should not be done without the use of assistive devices
- Patient handling assessment criteria and decision algorithms

The most promising components of a successful patient handling program include those that have instituted a "No lift policy" or safe patient handling. Included in the components were those items listed above that had a direct effect on reducing patient lost days at work, injury rates and costs to the organization. One of the most successful programs was a study that implemented a lift team program and saw a 62% reduction in patient handling injuries, 82% reduction in RN injury rate, 97% reduction in workers compensation costs, 91% reduction in lost work days and 76% reduction in modified duty days (Kutash, Short, Shea, & Martinez, 2009). The components of this program included portable ceiling lifts, floor based lifts, and lateral transfer devices for all patient care departments. Keys to success were not only availability of patient/lift equipment, but that equipment is made readily available on every unit.

Another study completed at the James A. Haley Veteran's Hospital in Tampa Florida also found that the availability of lift equipment in each room not only decreased time for the nursing staff to spend looking for equipment but also decreased modified duty days by 87% as well as decreased the severity when an injury occurred (Weinel, 2008). A third study found that nursing

injury prevention had a direct cost savings because of the value placed on retaining experienced staff (Morgan & Chow, 2007).

Overall, the consistent theme for reducing patient handling injuries is:

- implementation of strategies such as lift team
- portable lifting devices
- education/training

Most of studies did show a decrease in overall cost to the organization by decreasing workers compensation claims, lost work days and retention of healthcare workers.

Table 2

Summary Results of Systematic Review articles

Article Title/Author	Study	Setting	Intervention/ Description	Outcomes	Level/ Quality of Evidence	Recommend
A Patient Lifting intervention for preventing the work-related injuries of nurses: Finch Guthrie, Patricia, et all (2004)	Non-randomized controlled	Orthopedic and neurology unit in a Minnesota hospital	Evidenced based process to implement an effective lifting intervention, including back school, lift teams and lift equipment	Work replacement costs went from $48,220 to $2,560 in 2001 and 2002; injuries decreased from 21 to 9 & 95% of the staff attended back school.	Level III/ Grade B	Yes
Creating a culture of change through implementation of a safe patient handling program: Stenger, K., Montgomery, L., & Briesemeister, E. (2007).	Quality improvement project	University of Iowa Hospitals and Clinics.	Utilization of the Iowa Model of Evidence based practice to promote Quality care. There was no use of control and non-control group.	From 2002 to 2004 there was a decrease: workers compensation costs of 85%, lost work days 76%, and a decrease in the severity of the injury.	Level V / Grade B	Yes
Development and Benefits of a Minimal Lift Program on an In-Patient oncology unit: Mielnicki, M., & Lewis, L. (2007).	Non-experimental study	Four in-patient units, one in-patient oncology unit at Northwestern Memorial Hospital	To decrease the patient handling and employee incidents by 20% by piloting a minimal lift program.	77% reduction in incidents, 99.9% reduction in lost and restricted days, and 99.6% reduction in incurred and replacement cost.	Level IV / Grade B	Yes
Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks: Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J., & Fragala, G. (2006).	pre/ post design survey, injury logs, focus groups	23 high risk units (19 nursing home care units and 4 spinal cord injury units) in 7 facilities in southeast US	To create safer working environment for nurses by designing and implementing a multifaceted program that integrates evidenced based practice and technology.	Reduction: injury rates from 24.0/100 caregivers to 16.9/100; modified duty days from 1,777 to 539; work comp costs from $134,763 to $35,200.	Level III / Grade B	Yes
Effects of a Multifaceted Minimal-Lift Environment for Nursing Staff: Pilot Results: Zadvinskis, I., & Salsbury, S. (2010).	Quasi experimental without randomization	Two medical cardiology nursing units in an acute care hospital. .	To examine the effectiveness of a multi-faceted minimal-lift environment on frequency of injuries, equipment self report use, and workers compensation costs.	Intervention unit rate of injury was 3.26/100 full-time equivalents (FTE) versus 3.43/100 FTEs for control group. Injury costs decreased; intervention group by 75% & control group by 50%.	Level III / Grade B	Yes

Article Title/Author	Study	Setting	Intervention/ Description	Outcomes	Level/ Quality of Evidence	Recommend
Effects of training and experience on patient transfer biomechanics: Hodder, J., MacKinnon, S., Ralhan, A., & Keir, P. (2010).	Quasi experimental	Untrained and trained nurses recruited from Health care corporation of Newfoundland	To assess a component of the Back Injury Prevention Program (BIPP) that direct instruction was provided on patient handling techniques.	Training reduced spine deviation and peak muscle activity, therefore reducing the load on the back and injury risk.	Level III / Grade B	Yes
Ergonomics and economics of safe patient lifting: Stenger, K. (2007).	Quality Improvement Project	University of Iowa Hospitals and Clinics	Implementation of appropriate patient handling equipment and a multi-disciplinary ergonomic committee to review.	From 2002 to 2004 there was a decrease: workers compensation costs of 85%, lost work days 76%, and a decrease in the severity of recordable events	Level V / Grade B	Yes
Friction-reducing devices for lateral patient transfers: a clinical evaluation: Baptiste, A., Boda, S., Nelson, A., Lloyd, J., & Lee, W. (2006).	Experimental design with randomization	77 caregivers, working in eight acute care units from a large VA hospital	Every two weeks, one of eight devices, randomly selected were used by the participants	Power analysis determined that 184 transfers were required, and only 179 were performed. Importance of using assistive devices to perform transfers laterally was corroborated.	Level II / Grade C	Yes
Justification for a minimal lift program in critical care: Garg, A., Milholland, S., Deckow-Schaefer, G., & Kapellusch, J. (2007).	Systematic review	Compilation of several studies	Multiple studies results compared and broken down into the following categories: Cause, Biomechanical evidence, Nursing personnel perception, perceived stresses, education and training, intervention programs and Critical care.	Training in body mechanics and lifting technique is not enough to reduce Musculoskeletal disorders (MSD). Ergonomic interventions are effective in reducing the risk and severity.	Level I / Grade A	Yes
Lift team technologies elevate positive outcomes: Hobbs, T., Wolverton, C., & Clevenger, K. (2007).	Focus groups	Clarian Health, five hospitals in a large metropolitan area.	Clarian Health conducted focus groups with nurses 45 years and older to find key retention factors. Lift team was the number one recommendation.	Lift team was implemented at one of the large hospitals. In the first 6 months, a 30% reduction in costs was observed.	Level V / Grade B	Yes

Article Title/Author	Study	Setting	Intervention/ Description	Outcomes	Level/ Quality of Evidence	Recommend
Reduction of injuries associated with patient handling: Wardell, H. (2007).	Quasi experimental	Evaluated Safe Patient Handling Program (SPHP) in a Southern California hospital.	The SPHP included development of safe-patient handling policies, identification of high-risk, high injury departments and purchase of adequate equipment.	Equipment use increased six fold, year prior to implementation of SPHP report of strain and sprain injuries, from 92 down to 9	Level III / Grade A	Yes
Safe patient-handling program "UPLIFTS" nurse retention: Knoblauch, M., & Bethel, S. (2010).	Surveys and data collection	Small acute care satellite facility for a large hospital system,	Implementation of a safe patient handling program in response to a risk analysis, and purchase of equipment.	RN turnover went from 10% down to 5% (cost savings of $170,000 for the year). Injury cost over $230,000 from 2002-'04, while during the pilot study there were no lost work days due to patient handling injuries.	Level V / Grade A	Yes
Saving costs, saving health care providers' backs, and creating a safe patient environment: Hunter, B., Branson, M., & Davenport, D. (2010).	Quasi experimental	Northwest Texas healthcare system, all in-house clinical staff	Implement a safe patient handling program, utilizing lift equipment. This included ceiling mounted lifts, portable equipment and disposable/reusable support supplies.	Decrease in average cost per injury from $27,402 in 2002-2004 to $325 per case in 2007. The total direct cost went from $548,040 in 2002-2004 to $1,628 in 2007, while the cost of the program was recouped within 1 year.	Level III / Grade A	Yes
Successful implementation of ceiling-mounted lift systems: Weinel, D. (2008).	Program evaluation	Spinal cord injury unit at the James A. Haley Veterans' Hospital in Tampa, FL.	Integration of ceiling lifts technology for patient-handling tasks into nursing practice on a spinal cord injury unit.	Availability of the ceiling lifts in each room to decrease time spent looking for equipment. Modified duty time decreased by 87% and less severe injury reported.	Level V / Grade A	Yes
The Lift Team's Importance to a Successful Safe Patient Handling Program: Kutash, M., Short, M., Shea, J., & Martinez, M. (2009).	Quasi Experimental	10 departments at Tampa General Hospital evaluated over a 6 year period, all staff members included.	Implementation and evaluation of a lift team program.	Reduction of:62% in patient handling injuries, 82% in RN injury rate, 97% in workers comp costs, 91% in lost work days and 76% in modified duty days	Level III / Grade B	Yes

Article Title/Author	Study	Setting	Intervention/ Description	Outcomes	Level/ Quality of Evidence	Recommend
Training in safer and healthier patient handling techniques: Carta, A., Parmigiani, F., Roversi, A., Rossato, R., Milini, C., Parrinello, G., et al. (2010).	Program evaluation/pre-post design	In a 1250 bed hospital a health education program to focus on practical training and education	Risk assessment for all wards; health education program; indicators tested for each of the participants at the beginning, two and six months after the program had been completed.	Statistically significant improvement was noted in questionnaire scores and handling techniques; use of equipment and low back symptoms improved.	Level V / Grade A	Yes
Use of Evidence for Prevention of Work-Related Musculoskeletal Injuries: Stetler, Cheryl B.; (2003)	Systematic review	None indicated	Evidence based approach to prevention of work related musculoskeletal injuries	There are not any single solutions or interventions to prevent this complex problem, multiple strategies were suggested	Level I/ Grade A	Yes
Zero lift programs in small rural hospitals in Washington State: reducing back injuries among health care workers: Charney, W., Simmons, B., Lary, M., & Metz, S. (2006).	Descriptive	31 of 38 hospitals, thru Washington Hospital Services, a self-insured workers' compensation program,	Pre-post test to measure effect of implementing a zero lift program, comparing patient handling data	Patient handling claims decreased by 43%, time lost frequency was decreased by 50%; health care only claims decreased by 41% while total incurred cost per claim decreased by 24%.	Level IV / Grade A	Yes

Article Title/Author	Study	Setting	Intervention/ Description	Outcomes	Level/ Quality of Evidence	Recommend
Patient handling tasks with high risk for musculoskeletal disorders in critical care: Waters, T., Nelson, A., & Proctor, C. (2007).	Quality improvement	Task force organized that included representatives from (AORN), (NIOSH), the Patient safety Center of Inquiry at the James A. Haley Veterans Administration Medical Center (VAMC) and the (ANA).	Clinical tools were formulated and algorithms for high-risk tasks in perioperative settings.	Tasks with high risk for musculoskeletal disorders in critical care settings are identified clearly and appropriate solutions presented. No identified outcomes identified.	Level V / Grade C	No
Safer patient handling in your grasp: Dunning, (2009)	Opinion	Virginia Mason Medical Center, a 336 bed acute care hospital in Seattle, WA	Process that Virginia Mason used to establish a safe patient handling program	No outcomes identified	Level VI / Grade C	No
Taking the pain out of patient handling: Dubose, J. and Donahue, T. (2006)	Opinion	Information only	Recommendations of safe patient handling techniques	Need management support, appropriate equipment, proper training and non-punitive polices to reduce worker injuries	Level VI/ Grade D	No
Technology to promote safe mobility in the elderly: Nelson, A. et all (2004)	Information only	None	Description of new technologies that have been designed to help prevent adverse events in the elderly	Technology offers the potential to eliminate or decrease adverse events but no outcomes identified.	Level V / Grade C	No
The physical workload of nursing personnel: association with musculoskeletal discomfort: Menzel, M.N., Brooks, S.M., Bernard, T.E., and Nelson, A. (2004)	Cross sectional	US Veterans Hospital, including RN's, LPN's and NA's from five, high and low risk patient care units	To examine the association between high risk patient handling tasks and musculoskeletal discomfort in nursing personnel	93.4% response rate; no significant difference in prevalence of MSD between high and low risk units	Level IV / Grade C	No

Chapter 4: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

Best Practices for a Patient Handling injury prevention program

The addition of ceiling lifts, lift teams, lateral transfer equipment and staff education are all components of a successful patient handling program that promotes patient and healthcare workers safety in the workplace. The majority of the articles in this study that met the inclusion criteria were able to show the relationship between safe patient handling and decreasing both the cost to the organization and injury to the healthcare worker. Since healthcare can no longer rely on the utilization of body mechanics as a way to reduce patient handling injuries, resources need to be allocated to obtain the lifting equipment required and necessary to prevent not only workplace injuries, but injuries to the patient as well (Sedlak C., 2006).

While one of the most effective was the implementation of a lift team, this is not feasible in most organizations due to cost. There are however best practice scenarios that can be implemented at a much lower cost. The cost could be offset due to the decrease in injuries and lost workdays of the health care worker.

The one key factor in order to implement a best practice strategy is administrative support, since most of these strategies require dollars up front. A second key factor is the formation of an interdisciplinary team, made up of representatives from management, nursing, therapies, physicians, quality, occupational health and transport services. This team will be able to evaluate not only current, but future equipment purchases and workplace injury statistics. The other area to bring in on ad-hoc basis would be a decision support person, from the finance department. As many of the articles in this study showed a decrease in healthcare workers injury rates, this team will be able to review and make recommendations based on current statistics and

communicate those results to the rest of the organization. One of the best ways to communicate is through shared governance or unit based councils as well as monthly leadership forums.

Key factors of an effective program, aside from administrative support and an interdisciplinary team are equipment purchases. This can range from lift devices, disposable or reusable support supplies to air mattress or "hover mats". Since many organizations do not have the infrastructure to support ceiling lifts, bedside lifts can be just as effective. Organizations should think ergonomics when remodeling or designing expansion projects.

There should be constant reeducation of staff as well as reminders of the safe patient handling practices and can be done annually during competency training and ongoing when any new equipment is introduced or new staff hired. Training and reeducation can also be done if the interdisciplinary team sees an increase of patient handling injuries on a specific unit. Lastly, policies should be written in a language that supports minimal to zero lift of patients.

Discussion

The process of clinical research findings is supplemented by patient preferences and clinical expertise. Evidenced based practice (EBP) as a result of systematic reviews, is being incorporated into practice settings daily. Many regulatory and accreditation agencies support this process and it is becoming a part of the current healthcare culture. The Joint Commission, American Nurses Credentialing Center (which awards Magnet status) and the Institute of Medicine (IOM) are three major groups that recommend EBP as a vital element for healthcare organizations and providers. By the year 2020, as an anticipated goal according to the IOM, 90% of all clinical decisions will be supported by clinical information that has been obtained through the best available evidence. (Smith & Donze, 2010).

Implementation of such practices can be challenging and difficult for the provider. The organziation should be open to such a practice of incorporatiing new protocols and policies. The provider should be able to assess the envirnoment for readiness and barriers minimized. Organizational readiness is preparing for change, both psychologically and behaviorally and should be assessed prior to implementation.

Based on the results of the systematic review, my intent is to present this information to the Nursing Leadership team at my place of employment. I believe that based on patient safety and improving nursing satisfaction, this project would go hand in hand with the implementation of a safe patient handling policy. In an organization where applying for Magnet Status is appropriate, this research project can also be helpful in scanning the environment and forecasting for the future.

My participation in the National Association of Orthopaedic Nurses (NAON) on a local and national level has given me the opportunity to network with colleagues. I am also considering applying for presentation as a poster exhibit at one of the upcoming national NAON conferences.

Assumptions and Limitations

Limitations to this study have resulted because “hospital” was used as inclusion criteria and there may have been other studies excluded that had good statistical data. Long-term care and nursing homes, if included may have provided additional support and techniques necessary for implementation of a successful safe patient handling program. Although some robust conclusions were extracted from this systematic review, due to the hospital limitation, there is a possibility that generalization to other settings may be difficult.

Initial investment dollars may be a deterrent for smaller hospital, therefore not all studies were implemented in the same scale as some programs were initiated with less equipment than what was recommended. Patient handling aides/devices were not described so it was difficult to conclude and compare outcomes. Screening models were not standardized and the language in the zero lift policies was voluntary rather than mandated.

Because patient handling injuries can occur but not felt by the healthcare worker until later on, it is suggested that the data collection interval should be longer and possibly up to three years. It is essential that a Safe patient handling program (SPHP) be created and important to address barriers to using the equipment prior to the implementation of the program.

Recommendations for Future Research

Future improvements should consider the effects on the shoulder joint, just as susceptible as the back, during patient transfer training. According to BLS statistics in 2009, musculoskeletal disorders (MSD) of the shoulder accounted for only 13% of all cases, but median days away from work were 21 days. Back injuries, on the other hand accounted for over half of the cases but required only a median of 7 days to recuperate (Bureau of Labor Statistics, 2010).

Further studies are needed to examine the injury rate in the critical care area, although it is thought to be believed that due to the debilitation of the critical care patients, this population serves as a higher risk. There is also a need for future research into work related musculoskeletal injuries in nursing personnel that should expand to include incidental tasks not formally associated with a subject's assignment, such as assisting another staff member and the data that

should be collected should include the number of staff members assisting the patient during high risk tasks.

Exploring the patient, caregiver and environmental factors should be done in order to gain a complete evaluation of assistive devices, including the use more advanced statistical techniques. Future research should measure outcomes beyond a 12-month period, since we now know that many disabling injuries are cumulative. Objective data collection and not self-reporting would strengthen the evidence base to promote safe patient handling.

One way to improve outcomes in the health care arena depends on utilizing more evidence based medicine. One element to achieve this is continuing research on decreasing injury among healthcare workers, which will ultimately decrease the overall cost to an organization.

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(References and Appendixes (if used) should be treated as chapters for Insert Name Here

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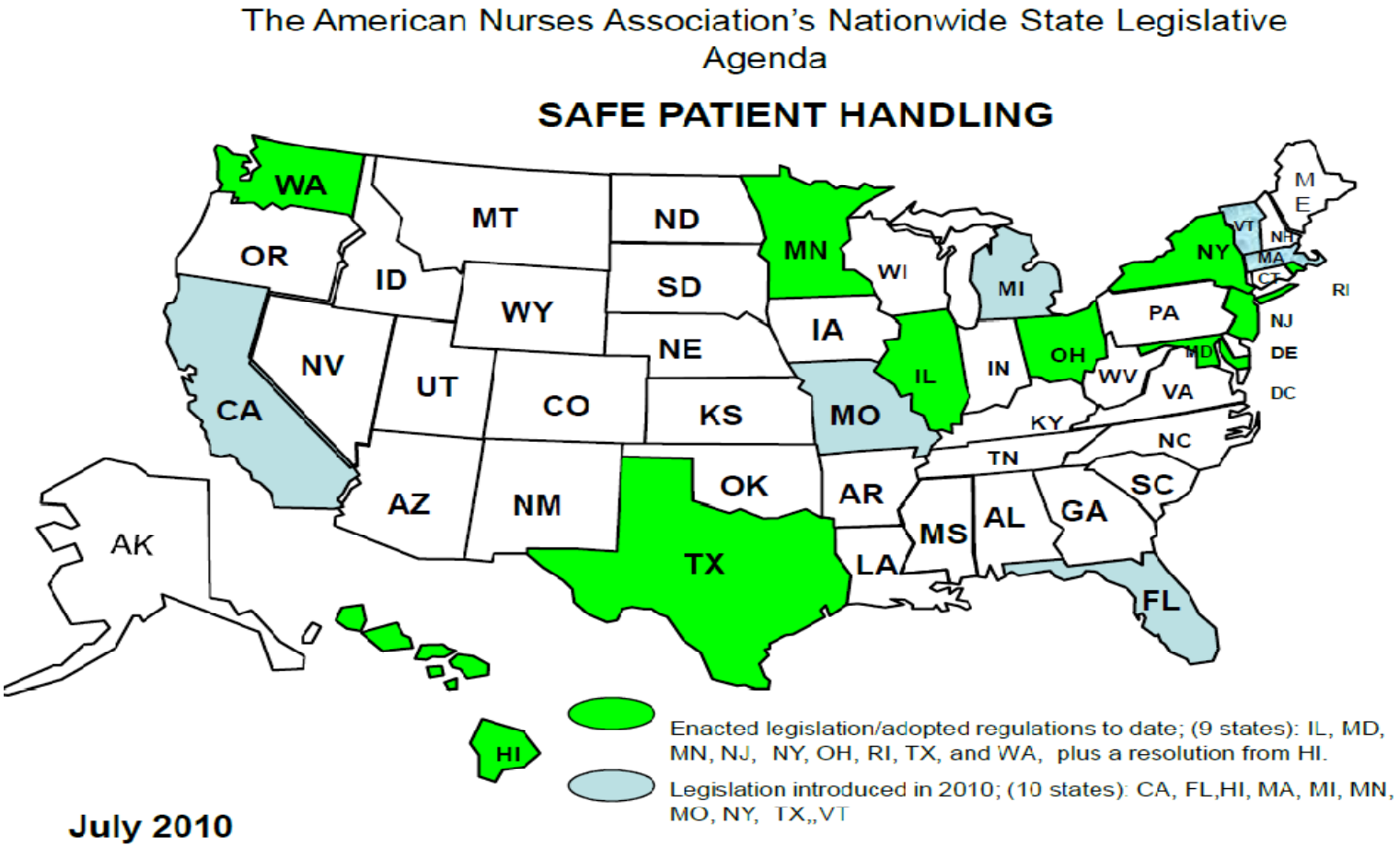
Appendix A



Source: This Safe patient handling map was found on ANA's website, Safe patient handling, State Legislation and was accessed on October 31, 2010 with last update noted of July, 2010. *http://www.anasafepatienthandling.org/Main-Menu/ANA-Actions/State-Legislation.aspx*