

Reducing Back Injuries Caused By

Repositioning Patients Up In Bed

Lori Stacy

College of St. Catherine

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### *Introduction*

The nursing practice problem that will be explored in this paper is the method of repositioning of patients up in bed (commonly known as boosting). This practice problem was chosen because of an injury the author suffered to the L5-L6 vertebrae as a result of repositioning patients in bed and the subsequent physical therapy and surgery to repair it. In addition, back injuries sustained from moving patients are a common cause of lost work time and short and long term disability for nurses. Currently, the most common method for boosting is by using a draw sheet to lift and slide the patient toward the end of the bed. This method, even when used correctly, can cause injury to the lifters due to friction, the bulk or weight of the patient and the inability to get close to the head of the patient's bed because of furniture or medical equipment. The purpose of this paper is to describe an alternative intervention to reduce the incidence of back injuries by encouraging nurses to use assistive equipment rather than using a draw sheet to reposition a patient in bed.

### *Review of the literature*

In a quantitative study to investigate the low back load and to quantify the influence of patient weight and disability during repositioning of patients in bed, Skotte and Fallentin (2008) studied nine female health care workers as they performed different patient-handling tasks, including repositioning a patient up in bed, in a lab setting. The tasks were performed with optional use of simple, low tech assistant devices (draw and sliding sheets). Patients were selected based on their weight and were supposed to have sufficient postural stability to sit on the edge of the bed. The authors found that most repositioning tasks frequently exceed the NIOSH

(National Institute of Occupational Safety and Health) action level of 3400N with 25% of those tasks considered to be at high risk. The weight and type of disability of the patient caused significant differences in low back loading of the health care worker, however the influence of these factors were modest compared with the influence of the health care worker's techniques and use of assistive devices. Turning the patient was found to be the task causing the lowest low back loading of the health care worker which is important since turning of the patient is necessary in order to fit the draw and sliding sheets. As a result of this study, the inclusion of 'reposition in bed' among the high-risk tasks performed by health care workers seems well justified.

In an experiment study, Marras, Davis, Kirking and Bertsche (1999) observed 17 participants as they performed four manual repositioning techniques: one-person hook method; two-person hook method; two-person draw sheet method; two-person lifting thigh and shoulder lift; to identify the nature and range of low back spinal forces and risk of low back disorder associated with patient handling tasks and techniques commonly used. Several interesting results appeared, first, the single-person hook method had the highest risk of lower back disorder at greater than 90% probability. Second, the hook and the thigh and shoulder two-person methods had risk values similar to the single-person technique. Finally, the draw sheet method was lower at about 70% probability but was still considered to be 'high' risk. The two-person draw sheet method was found to have the lowest lateral shear and compressive loads with only 5% of the tasks exceeding the 6400N compression limit. While the compression loads were lower, these loads would still be considered to be dangerous since they were above the 3400N limit for L5, S1 vertebrae set by NIOSH and are in combination with A-P shear forces that approached or exceeded the tolerance limits of 1000N. The authors' conclusion that none of the

repositioning techniques of this current study are totally safe for patient handlers is significant to all health care workers.

In a study published in the *International Journal of Nursing Studies*, Owen, Keene, and Olson (2002) found that after implementation of a hospital ergonomic program, back and shoulder injuries were reduced and lost or restricted workdays were decreased. This quasi experimental study was used to compare the perceived exertion felt by the nurses of two hospitals when carrying out selected patient handling tasks. In the experimental hospital, an ergonomic program was instituted and assistive devices were used for repositioning patients. In the control hospital, the traditional draw sheet method was used. The 18 month post intervention data showed the injury rate had decreased at the experimental hospital. Five years later data showed continued declines. In addition to assistive equipment, the authors found ergonomic elements such as, good patient assessment of mobility, good communication about repositioning methods used for specific patients, proper training, and adequate equipment availability important to the success of reducing the physical demands of nursing. Many measures are already in place to protect health care workers from illness and needle sticks, back injuries are just as detrimental to health care workers and assistive measures need to be standard practice.

In a study published in the *Journal of Healthcare Safety: Compliance & Infection Control*, Owen and Hasler-Hanson (2002) using a descriptive study design compared the efficacy of three assistive devices in reducing shoulder, upper back, lower back, and whole body stress to subjects while repositioning a “patient” up in bed. Five senior nursing students with experience in lifting patients used the devices in a lab setting. The devices included a draw sheet, an ultra-low-friction fabric sheet with handles on each side, and a nylon, silicone lubricant filled sheet. It was found that the draw sheet, the most common method of repositioning patients in

bed, had the highest ratings of perceived exertion to the shoulders, upper back, lower back, and whole body when used to reposition a patient up in bed. In addition, for the 'patients' the draw sheet method was perceived to be the least comfortable and least secure of the methods studied. Based on the results of this study, the use of friction reducing devices should be mandatory for all health care workers charged with patient repositioning responsibilities.

The articles have many similarities. The most important similarity is they all state that work related injuries for health care workers can be significantly reduced when assistive equipment is used. The studies recognized back and shoulder injuries were common for health care workers and that the problem is not a new one. In addition they state back and shoulders injuries occurred more often in situations where assistive devices were absent and that the lower back was the prime body area for reported occupational related pain and injury. Many of the authors have found that the repositioning of the patient is one of the most widely reported tasks associated with low-back injuries. The current spinal load and lower back disorder risk support the findings that repositioning the patient in bed poses a high potential for injury to the patient handlers who perform the tasks. Each study used repositioning tasks that are commonly used in patient care settings. The studies analyzed the type of task, technique and assistive device used for repositioning along with considering the weight of the patient as well as the patient's ability to assist, when attempting to determine the actual low back load for each task.

Each study used different types of measuring tools to evaluate the load compression on the health care workers. Three of the studies used specific scientific equipment such as a Lumbar Motion Monitor; Electromyogram biomechanical model with bi-polar electrodes; and Force platforms to measure trunk motion variables, to estimate spinal loading, to calculate net torque at the L4/L5 joint, and to measure ground reaction forces. The other study simply had

the subjects rate the perceived exertion on a Borg scale of 0-10, with zero being no exertion and ten being extremely heavy, maximal exertion. This method was deemed appropriate to give an estimate of physical stressfulness because previous researchers found no significant differences in findings from the Borg Scale versus the more mechanical methods.

For each study, the authors aspired to identify the significant risks health care workers face in repositioning patients, and to communicate the methods for reducing those risks. Each article also identifies that manual attempts to reposition patients carry risks to health care workers and list assistive devices as the only safe method repositioning. The studies investigated the low back loading during patient handling tasks and have confirmed the elevated low back injury risk by demonstrating compressive forces on the low back frequently in excess of the suggested NIOSH 3400N threshold for low back compression. They state that the inclusion of 'repositioning a patient up in bed' among the high risk tasks performed by health care workers is well justified. Finally, they state that the health care worker's use of friction reducing devices along with a full assessment of patient's ability to assist is essential for back injury prevention.

The research articles had many strengths. All studies used living 'patients' rather than mannequins and tasks were often repeated if there was a suspicion of erroneous patient performance though the patients were often diligently trained on how to behave to accurately reflect the medical condition they were acting. One study was actually conducted in two different hospitals with each health care worker receiving 2.5 hours of training about the assistive devices before the study actually began. Finally, the majority of the health care workers used in the studies were female which is representative of the current nursing population. There were several limitations to the research described in these articles. Three of the studies were conducted in labs without the benefit of real patients. It can be difficult for a healthy

person to fully simulate an ill person or the lack of muscle force required to match that of a hemiplegic and paraplegic. However, it is unlikely the limitations would change the results of the studies. In fact, if real patients had been used, it is likely the results would have detailed a higher level of risk to the health care workers. All of the studies were conducted with relatively small numbers of patients and health care workers. Force platforms were used in one study and the force platforms may have restricted movements of the health care workers.

Although patient handlers suffer from low back injuries at an alarming rate worldwide, there has been limited research quantifying the risk for the specific tasks performed by patient handlers. Of that research, the majority of the studies have mainly focused on patient from one surface to another. Other studies have assessed low back compression for different tasks by using different techniques and assistive devices however few data are available on the influence of patient weight and disability. According to guidelines providing recommendations for patient handling, the patient's weight and the ability to assist should be taken into consideration when assessing risk. Finally, little research has been done relating to the task of repositioning patients up in bed although this has been considered one of the generic components of high risk tasks during patient handling.

#### *Application of findings*

After careful analysis of the literature, the author recommends the use of assistive equipment for all tasks involving patient handling. For the task of repositioning patients up in bed, it is strongly encouraged that health care workers use an assistive device, such as a friction reducing sheet. Further, it is recommended that a friction reducing device be placed in every patient room to ensure availability for use by health care workers. By using assistive devices for this task, compression loads to the health care worker's lower back will be reduced and the

number of back injuries will decrease. The current practice of repositioning a patient up in bed using only a draw sheet should be discontinued. Since draw sheets are typically made of a thicker, non-slippery material, they actually increase friction and increase compression loads to the backs of health care workers, thus causing more injuries when they are used to reposition a patient up in bed as explained in the literature.

Several disadvantages and advantages of the proposed intervention were identified. Disadvantages to eliminating the use of the draw sheet include the possibility that health care workers could engage in even more potentially dangerous repositioning methods if assistive devices are not readily available, the costs to purchase additional assistive devices to assure their availability, and the cost of ensuring health care workers are knowledgeable about the use of assistive equipment. Advantages to eliminating the use of the draw sheet include cost savings from not purchasing draw sheets, less wrinkled bedding under the patient which could potential reduce skin breakdown, the potential decrease in patient repositioning related injuries to health care workers, and the potential decrease in cost related to workman's compensation claims and lost work days.

#### *Identification of barriers*

There are several barriers to the implementation of this intervention. The first one is that many health care facilities are in a financial crisis due to the current economy and may not be willing to spend additional money on equipment even though it has the potential to reduce costs related to worker injuries. Another barrier to implementation is many health care workers do not perceive repositioning a patient up in bed to be a high risk task. And, finally, unless enough equipment is available for health care workers to easily access, health care workers will likely not use it because it takes time to go and look for it. Recommendations to overcome these

barriers include careful analysis to compare the cost of purchasing additional equipment and training to the costs related to worker injuries: intense education on the importance of using assistive equipment for positioning a patient up in bed and potential physical and institutionally imposed consequences of not using it; and the complete removal and elimination of regular draw sheets..

### *Conclusion*

Studies have shown that nurses suffer from back injuries at rates resembling those of construction workers. Safety measures have become mandatory for many occupations, including nursing, having high risk of back injury. However, the task of repositioning patients up in bed has largely been overlooked even though it falls into the high risk category. Several assistive devices have been shown to reduce risk by lowering the compression load to the lower back however nurses often do not use them because: they lack a good understanding about the serious risks involved; there is often not a sufficient number of assistive devices available; and nurses lack the time needed to go and find assistive equipment if it is not easily accessible. Use of assistive devices for repositioning patients up in bed needs to be mandated by hospitals or by the government. Penalties for hospitals lacking sufficient equipment availability or for nurses not using the equipment even when adequately available may need to be put in to place in order to raise the awareness of this problem. Once significant awareness has been gained, nurses will understand the high risks associated with this task and the importance of using assistive devices and hospitals will see that the expenses related to back injuries from repositioning patients up in bed far outweigh the costs of purchasing adequate numbers of assistive devices to ensure their availability.

## References

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