

Preventing Injuries Using an Ergonomic Approach

The saying “work can be dangerous to your health” is an important phrase in the nursing profession. In hospital settings, there are several dangers that especially affect nursing personnel. Although needle-stick injuries are the most frequently reported injury among hospital nurses, the most costly for health care facilities are overexertion injuries to workers’ shoulders or backs.¹ These problems have been studied, and progress has been made to decrease their prevalence.² For example, the number of needle-stick injuries has decreased significantly in hospitals that use ergonomically designed syringes.³

Ergonomics is the scientific study of human work.⁴ It involves matching the job to the worker, rather than attempting to fit the worker to the job. The goal in ergonomics is to identify aspects of the job that are particularly hazardous and redesign them to be safer. This can be accomplished by redesigning the task, product, work station, environment, or overall work organization. In the example of needle-stick injuries, the product (ie, syringe) was redesigned so that the needle is shielded or retracted into the barrel immediately after the injection. In this way, nurses

cannot self-inject themselves with a used needle, and the product now better fits the worker.

Many approaches to decreasing back and shoulder problems have been tried in general industry, as well as in health care settings. Emphasis primarily has been on education and training, with a definite focus on body mechanics.⁵ These approaches, however, have had little effect on the problem, as the aim has been to change the worker instead of the job or the task.⁶ Studies indicate that an ergonomic approach involving the assessment of stressful tasks and the development of alternative methods to decrease this stress can reduce the number of overexertion injuries.⁷ As a result, the assumption that reducing physical stress reduces injuries was true.

INJURIES INCREASE IN FREQUENCY

In 1984, nurses ranked fifth among workers in all occupations who claimed workers’ compensation for back injuries; only heavy laborers (eg, sanitary engineers, laborers, warehouse workers) ranked higher.⁸ The rate of overexertion injuries among hospital nurses is almost double that of workers in private industry.⁹ In 1990, the national goal was to decrease these injuries in nursing personnel from 12.7 injuries per 100 full-time nurses annually to nine.¹⁰ According to one source, however, the rate actually had increased to 17.8 injuries per 100 nurses by 1995.¹¹

NURSES CHANGE JOBS DUE TO BACK PAIN

Since the 1980s, many nurses have changed positions or actually left the nursing profession because of overexertion injuries.¹² In one study, a questionnaire revealed that

A B S T R A C T

The risk of back injury is a continuing problem for nurses. Patient-handling tasks (eg, transferring patients on and off stretchers, repositioning patients on OR beds) are a major precipitating factor to this problem. Educating nurses about body mechanics has not been the answer to preventing back injuries; however, changing the physical demands of the job (ie, using an ergonomic approach) by using assistive devices (eg, friction reducers) has been proven to decrease perceived stress and injury rates and increase patient comfort. This article focuses on the problem of nurses’ back and shoulder overexertion injuries and explores the application of ergonomics in the perioperative setting. *AORN J* 72 (Dec 2000) 1031-1036.

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Thirty-eight percent of respondents had suffered back pain severe enough to require leave from work.

38% of 503 nurse respondents had suffered occupation-related back pain severe enough to require leave from work.¹³ Twenty percent of those with back pain said they had made at least one employment transfer (eg, from an intensive care to an obstetric unit; from the hospital inpatient setting to a school setting; from a staff nurse to a pharmaceutical representative) to decrease the amount of physical stress involved with lifting or moving patients. Twelve percent of respondents indicated they were considering making an employment transfer, and another 12% stated they were thinking about leaving the nursing profession because of occupation-related back pain. Another study in England found that 12% of all nurses intending to leave nursing permanently cited back pain as either a main or contributing factor.¹⁴

TRIGGERS TO BACK PAIN AND INJURY

The lifting and transferring of patients has been found to be the most frequent precipitating trigger of back and shoulder overexertion problems in nurses.¹⁵ These studies, however, do not focus on the perceived triggers of overexertion problems for nurses in the OR. To address this lack of information, this author conducted an informal discussion with eight nursing staff members who worked in the OR of a large hospital. These nurses indicated that the following triggers affected back pain or injuries in their setting:

- standing for long periods of time;
- lifting and holding patients' extremities;
- holding retractors for extended periods of time;
- transferring patients on and off OR beds;
- reaching, lifting, and moving equipment; and
- repositioning patients on OR beds.

Although all of these tasks need to be studied to determine how to decrease their physical stressfulness, this author first focused on the task of trans-

ferring patients on and off OR beds by studying the perceived physical stressfulness of the similar task of transferring patients from beds to stretchers.¹⁶

AN ERGONOMIC APPROACH TO TRANSFERRING PATIENTS

As part of this study, the author conducted a laboratory test to determine which assistive devices nurses perceived as being least stressful to use in transferring patients on and off stretchers.¹⁷ Eight nurses volunteered to perform transfers and act as patients to determine level of comfort in the transfers. The assistive devices studied included

- a roller board, which is commonly used in ORs;
- a polyethylene slider board (Figure 1); and
- a friction-reducing pad (Figure 2), which is made of two pieces of liquid-proof, surface-disinfectable material that are sealed at the edges and contain a silicone lubricant that continually coats the inside.

The method used with each of these devices involved turning the patient to the side, placing the assistive device under the draw sheet, placing the patient on his or her back, and using the draw sheet to pull the patient to the bed or stretcher.

Researchers found that the nurses perceived significantly less physical exertion ($P < .01$), and, as patients, the nurses were significantly more comfortable ($P < .01$) when the friction-reducing pad was used. By using this device, the nurses had to pull only lightly on the draw sheet because there was no friction impeding the process. As a result, the nurses chose the friction-reducing pad for use with actual patients.

The next step of the study took place in two hospitals, one as a control and one as an experimental site. At the control site, the nurses used their usual method of transferring patients from bed to stretcher and from stretcher to bed (ie, at least two nurses used a draw sheet to lift and pull the patient). After completing each task, the nurses rated the physical stress caused to their backs and shoulders. The perceived exertion scale ranged from zero (ie, no exertion) to 10 (ie, extremely heavy, maximum exertion). In this test, actual patients rated their comfort during the transfer using a scale of zero, meaning very comfortable, to seven, meaning extremely uncomfortable.

At the experimental site, nurses used the friction-reducing pad to transfer patients from bed to stretcher and from stretcher to bed. In this

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