

A Foundational Study for Ergonomics

Identifying & controlling MSD risks in a hospital setting

By Patrick L. Yorio and Lon H. Ferguson

REDUCING THE NUMBER of musculoskeletal disorders (MSDs) that healthcare professionals experience is one of the most challenging safety issues facing healthcare establishments. The effects of MSDs greatly reduce revenue through direct and indirect costs. Over time, these costs prove to be greater than the cost of efforts to eliminate MSD hazards in the workplace (Fragala). Although OSHA's Ergonomics Program Standard was rescinded in March 2001, the agency has initiated a nonregulatory approach to the control of ergonomic hazards and has begun to issue guidelines targeting various industries, including nursing homes.

An MSD is any condition that involves the nerves, tendons, muscles and supporting structures of the body (NIOSH). These disorders encompass a wide range of problems (e.g., carpal tunnel syndrome, tendonitis, tension neck syndrome, low-back pain) and can differ in severity from mild, periodic symptoms to severe, chronic and debilitating conditions (NIOSH).

A risk assessment is one of the first steps toward implementing an ergonomics program. Through this assessment, jobs with the greatest MSD risk factors—known as problem jobs—are identified. According to OSHA, problem jobs are any job where an MSD has been reported. However, in the strictest

extremes and/or vibration (NIOSH). To be most effective, both potential exposures and actual reportable cases must be addressed when completing the risk assessment.

This article describes a process used to complete an MSD risk assessment within a healthcare establishment. As background to that study, one must first understand the extent of MSD risk in healthcare establishments as well as the current status of OSHA activities regarding ergonomics.

Accident Statistics: MSD Risk in Healthcare

Those in the nursing profession, including registered nurses (RNs), licensed practical nurses (LPNs) and nursing aides employed by healthcare service providers, face the greatest risk for developing an MSD within healthcare establishments. According to the Bureau of Labor Statistics (BLS), in 1999, the nursing profession ranked first in terms of frequency and severity of work-related MSDs (Table 1). Universally, all nursing professionals, regardless of the level of education, administer physical patient care. Research has indicated that handling patients in any manner can place a considerable load on the spine—up to two times the acceptable level for humans (Metules, et al).

Nursing & MSDs

Nursing aides do not perform tasks that pose a unique MSD hazard in comparison to RNs. The similarity in job descriptions among RNs, LPNs and nursing aides allow the three job titles to be grouped as “nursing personnel.” Universal job descriptions taken from BLS's *Occupational Outlook Handbook*, allow the following job descriptions to apply:

- RNs plan, implement, evaluate, record, administer and help other nursing disciplines in the delivery of appropriate patient care;
- LPNs provide appropriate patient care under the supervision of RNs;
- nursing aides provide basic nursing care to residents, along with various tasks under the supervi-

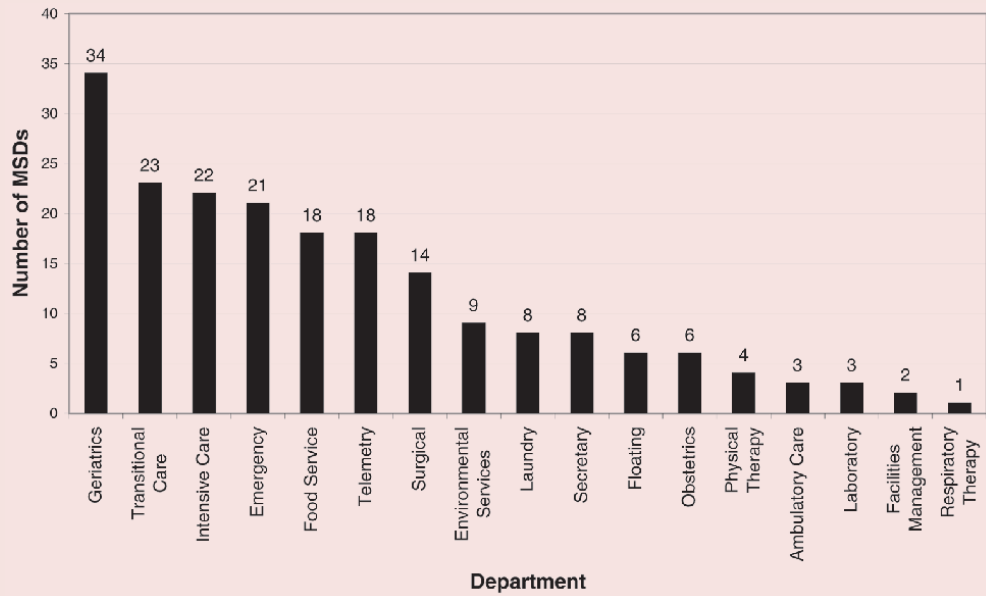
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sense, this does not consider potential exposures where occupational risk factors exist. Such exposures can be identified by focusing on MSD risk factors such as repeated or sustained exertions, forceful exertions, stressful postures, mechanical stress, t e m p e r a t u r e

Figure 1

Frequency of MSDs by Dept., 1999-2000



sion of nursing staff (BLS *Occupational*).

All three jobs have a common task—direct physical patient care in the normal course of providing “appropriate care” to residents. Most MSDs resulting from any of the nursing personnel job titles are directly related to one common task: patient handling (Garg).

The 1999 BLS statistics, which distinguish between nursing aides and RNs, are directly proportional to the number of active professionals and the number of jobs provided across the country. Most employment opportunities for the nursing profession are provided through nursing homes and hospitals. In 1997, throughout the U.S., approximately 17,000 nursing homes were in operation; in 1998, 6,021 hospitals were in operation (BLS “Workplace”). Nursing aides accounted for 62 percent of the hours logged in nursing homes across the U.S. from 1991 to 1995, while RNs accounted for just 16 percent (Harrington, et al). In hospitals across the U.S., RNs represent the majority of hired nurses; large numbers of RNs are legally mandated because of the skilled and knowledgeable patient care required (Harrington, et al).

An obvious relationship can be derived from the large number of nursing aide MSDs in 1999 and the large number of nursing aide jobs provided throughout the country: the number of MSDs is proportional to the number of jobs. The same can be said for the number of MSDs experienced by RNs.

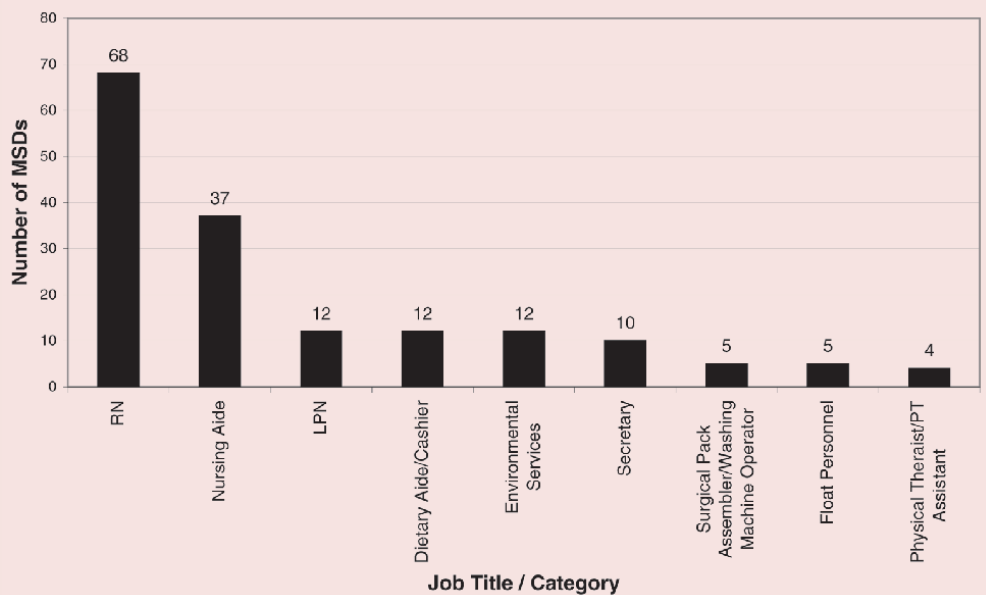
If these categories are combined, based on similar tasks within their job descriptions, the result is staggering. The number of MSDs involving time away from work for “nursing personnel” in 1999 is 57,400. Therefore, RNs and nursing aides represent nearly 10 percent of the 582,300 MSDs that resulted in days away from work in 1999. The combined total is 15,700 cases above the next-highest job title in that same year.

OSHA & Ergonomics

On April 5, 2002, OSHA announced a comprehensive plan to reduce ergonomic injuries in the workplace. The plan, which is nonregulatory in

Figure 2

Frequency of MSDs by Job Title, 1999-2000

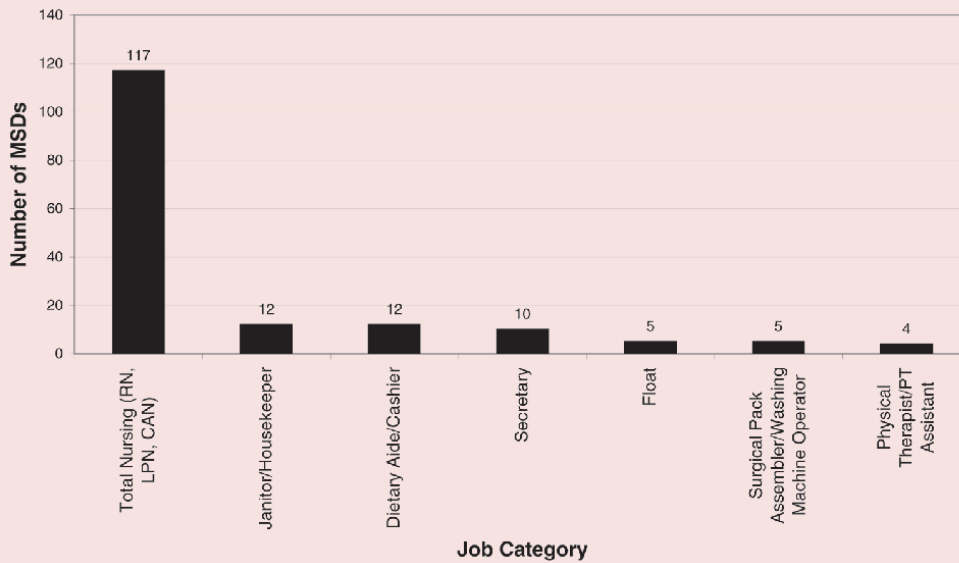


nature, involves a combination of industry-targeted guidelines, tough enforcement measures, workplace outreach, advanced research and dedicated efforts to protect immigrant workers from deliberate poor working conditions (OSHA). Although MSD risk reduction programs are not mandated by any standard, MSD hazards are covered under OSHA’s General Duty Clause, and the agency has made clear its intention to focus enforcement efforts on those employers who ignore MSD hazards.

According to the agency, this plan is designed to maximize employer options for developing site-specific risk reduction programs and methods. This flexibility is based on OSHA’s belief that employers are beginning to recognize that the costs associated with MSDs outweigh the costs of developing an

Figure 3

Frequency of MSDs by Job Title with Nursing Personnel Combined, 1999-2000



time workers. For this reason, healthcare establishments need to pay particular attention to developing an ergonomics program aimed at reducing MSD hazards in the workplace.

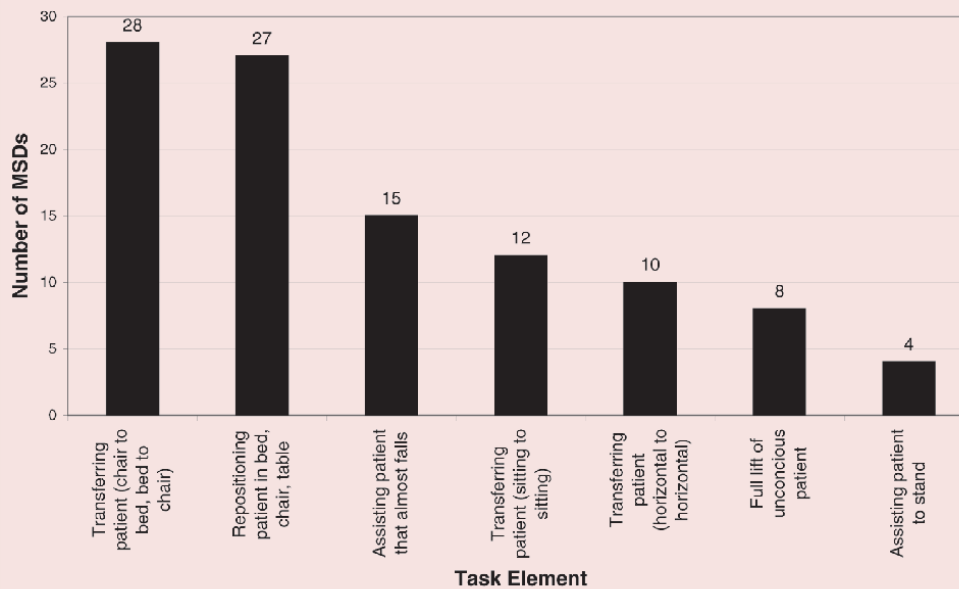
Risk Assessment

As noted, identifying problem jobs is the first stage of developing a comprehensive ergonomics program. This analysis evaluates the severity of existing problems and helps management set priorities for intervention. The first step is to study the establishment's accident records. To ensure that all employees at risk have been identified, jobs associated with MSD risk factors, regardless of accident history, are also identified as problem jobs. Employees working in an identified problem job should be observed and interviewed for feedback in order to identify specific symptoms and risk factors that are present.

For feedback to be effective, employees must be trained how to recognize and report MSD signs, symptoms and risk factors; they must also understand the importance of early reporting. The following discussion reviews the authors' study as an example for identifying, categorizing and ranking the problem jobs within a healthcare facility.

Figure 4

Nursing Personnel MSDs by Task Element, 1999-2000



Identifying Problem Jobs: A Study in One Hospital

The authors completed a study at the beginning stages of the development of an ergonomics program at a sole-care provider hospital with 137 beds. The site has seven floors

consisting of the following departments: surgical, emergency, geriatrics, intensive care, ambulatory care, transitional care, environmental services, food service, laboratory, obstetrics, respiratory therapy, telemetry, physical therapy, facilities management and laundry.

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The primary goal of the study was to identify all jobs that had experienced an MSD or were at risk of developing one. To target intervention efforts, the secondary goal was to identify trends in the findings, which were then used to develop an ergonomics program to address the hospital's major areas of

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MSD risk. This study can be used as a model to develop the foundation for designing and implementing a comprehensive ergonomics program in any healthcare establishment.

To develop the most efficient and cost-effective program, one must identify not only problem jobs, but also the hazardous tasks associated with those jobs. One must then break down hazardous tasks into elements. This worksite analysis began with a complete review of more than 400 formal injury reports from 1999 and 2000, followed by interviews and observations throughout the various departments. The injury reports were analyzed for frequency of MSDs for each job title. Interviews and observations confirmed problematic tasks. This process produced a ranking of job titles, departments and tasks associated with an MSD. Based on a detailed injury description (provided in the injury reports), specific task elements that were identified as causing the MSD were derived. For example, the nursing personnel task that occurred most frequently was patient handling.

The detail provided in the injury description allowed "patient handling" to be broken down into various task element categories. Mutawwe, et al noted similar task element categories for "patient handling" tasks (18+). The fundamental premise and value of the patient handling task elements were derived from a healthcare study conducted by NIOSH throughout the early 1990s (Owen). The elements used in this study were:

- assisting a patient that almost falls;
- full lift of an unconscious patient;
- repositioning a patient in a bed, chair or on a table;
- transferring a patient from bed to chair or chair to bed;
- helping a patient to stand;
- transferring a patient horizontal to horizontal (e.g., bed to bed);
- transferring a patient from a sitting position to a sitting position.

These categories were found to encompass most patient-handling elements performed by nursing personnel in the course of normal duties at this particular facility. By quantifying and ranking these elements, an ergonomics program can be designed to focus on element-specific administrative policies and training. Furthermore, specific mechanical patient handling devices can be purchased to combat the highest-ranking elements.

The Results

All departments in the establishment had experienced an MSD, but disorders had occurred most frequently in the geriatrics department, followed by transitional care, intensive care and emergency (Figure 1). Job titles and categories that had experienced an MSD-related disorder were environmental services, float personnel, dietary aide/cashier, surgical pack assembler/washing machine operator, physical therapist/physical therapist assistant, RN, LPN and nursing aide.

Table 1

MSDs Resulting in Days Away from Work, 1999

Job Category	Number (in 1,000s)
Total musculoskeletal disorders	582.3
Nursing aides, orderlies and attendants	44.3
Truck drivers	41.7
Laborers, nonconstruction	32.8
Assemblers	17.9
Janitors and cleaners	14.1
Registered nurses	13.1

Source: BLS, "Workplace Injuries and Illnesses in 1999."

RNs within the establishment accounted for the greatest number of work-related MSDs, which can be directly attributed to the number of RNs on staff compared to the number of LPNs and nursing aides. This hospital employed more than 200 RNs, 45 LPNs and 45 nursing aides. The number of MSDs affecting RNs outnumbered the next highest job title by 31; nursing aides ranked second in frequency (Figure 2). Patient handling was found to be the only task that caused an MSD among nursing personnel. Combined into one job title grouping, nursing personnel had 69 more MSDs than all the other job titles combined (Figure 3).

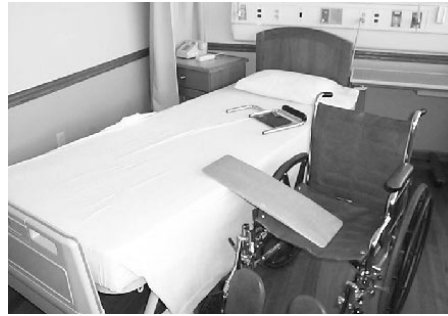
At this facility, nursing personnel performed the vast majority of patient handling. Due to this fact and because they most frequently experience MSDs, the nursing personnel job category was analyzed by patient-handling elements. It is important to note that the rankings are calculated by the number of MSDs reported per patient-handling element regardless of and without specific numbers as to how many times the elements were performed throughout the normal course of duties. The following list ranks elements from greatest to least risk (Figure 4).

- 1) transferring a patient from bed to chair or chair to bed;
- 2) repositioning a patient in a bed, chair, or on a table;
- 3) assisting a patient that almost falls;
- 4) transferring a patient from a sitting position to a sitting position;
- 5) transferring a patient horizontal to horizontal;
- 6) full lift of an unconscious patient;
- 7) helping a patient to stand.

Before & After the Study

Before this study, the establishment had three general policies oriented toward MSD reduction. The first, "Body Mechanics," listed general principles of physical positioning to be followed when handling patients or objects. The second policy outlined proper guidelines for the use of patient lifting devices. The estab-

By identifying problem jobs, a site can evaluate the severity of existing problems and set priorities for intervention.



Both manual (Photos 1 and 2, top) and mechanical patient-handling devices (Photos 3 and 4, bottom) can help reduce exposure to musculoskeletal risks in the healthcare settings.

lishment had two mechanical lifting devices, one on the third floor, one on the seventh; employees were directed to obtain one of the devices before moving or adjusting a patient when possible. The third policy detailed proper methods and techniques to use when manually performing patient handling tasks.

Patient handling training in this facility was primarily directed at preventing low-back injuries because hospital management suspected that such injuries accounted for the greatest percentage of workers' compensation payments; this study confirmed those suspicions.

Before the study, MSD preventive training was centralized and took the "hit or miss" approach. After this study, several changes were made:

- Management developed and implemented a new MSD training program.** Under this program, an in-house training team (consisting of employees and management) works with a given department to train staff involved in patient handling. Training sessions targeted each department's unique hazards.

- Management developed an in-house ergonomics committee.** The committee includes members of management, employees and a representative of the insurance provider. The committee's mandate is to reduce the number of MSD injuries suffered at the site. Its activities include continual review and development of the facility's ergonomics program; communication of hospital-wide ergonomics goals; oversight of the annual operating budget for ergonomics; and creation of hands-on, practical training sessions and activities utilizing in-hospital case studies.

- Management purchased additional mechanical patient handling devices in 2001.** Two devices were purchased in 2001 and two more are in the budget for 2002. The devices are strategically located to be readily accessible to the departments most in need.

Following these changes, the number of MSDs dropped from 19 in the first quarter of 2001 to 10 MSD in the first three months of 2002. The ergonomics committee attributes this reduction to an increased use of mechanical patient lifting devices and manual transferring devices, increased awareness of task elements to avoid, and early reporting of MSD signs and symptoms—all of which are a direct result of a more-focused training program.

Conclusion

As this study shows, review of existing accident records can be used as a foundational step toward the completion of an assessment of MSD exposures in a healthcare establishment. The methods presented here can be applied universally. To conduct a valid risk assessment, a facility must keep meticulous accident reports; detail and accuracy is especially important when describing the accident sequence and in identifying injury causes. To accomplish this, employees should be encouraged to communicate openly about MSD hazards and injuries. This requires that employees be well-educated on MSD signs, symptoms and risk factors. In addition to identifying problem job titles, management should determine what tasks and task elements place those working under a given job title at risk for an MSD. Once risk factors within the facility have been identified, appropriate engineering and administrative controls can be developed. ■

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