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Featured Article

An Ergonomic Protocol for Patient Transfer That Can Be Successfully Taught Using Simulation Methods

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KEYWORDS
simulation;
hierarchical task analysis;
back injury;
ergonomics

Abstract

Introduction: Nursing personnel injury related to patient transfer is epidemic, and reduction of injury rates is a national priority. Hierarchical task analysis (HTA) was chosen to address this issue.

Method: HTA methods were used to create an optimum task set and protocol which consisted of Internet-based education, simulation practice, and debriefing. Participants ($N = 71$) were randomly assigned to teams to perform simulated transfers. Pre- to postintervention transfer success was evaluated by ergonomic experts.

Results: Each team improved significantly from pre- to postintervention ($N = 19$), with every protocol step demonstrating improvement ($N = 10$). Interrater reliability of the evaluation instrument was calculated (.43−.83).

Conclusion: Simulation was used successfully to improve transfer success. This approach shows promise in reduction of transfer-related nursing injury.

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Introduction

Bernardo Ramazzini (1633−1714), the father of modern occupational medicine, first identified and studied

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workplace-related disease in the late 1600s (Ramazzini & Wright, 1940). The striking fact is that in the more than 3 centuries since Ramazzini first identified the problem of workplace-related injury, it persists, with an epidemic now seen in nurses and nurse aides. Nurse aides and nurses have the highest rate of workers' compensation claims within the health care industry and are consistently among the top 10 of nonfatal work-related injury groups among all U.S. workers. When combined, these two groups are second in total injuries among all U.S. occupations, exceeding groups such as laborers and dock workers (de Castro, 2004a, 2004b; Edlich, Woodard, & Haines, 2001; U.S. Department of Labor, 2007a, 2007b). This high incidence of musculoskeletal injury (MSI) in the nursing profession has been widely reported and analyzed (Blakeney, 2003; Charney, 2005; de Castro, Hagan, & Nelson, 2006; Edlich et al., 2005). The National Institute of Occupational Safety and Health (2006) reports an annual prevalence rate of back pain among nurses of 40% to 50%, with up to 52% of nurses reporting having had chronic back pain of 14 or more days within the past 6 months. The National Institute of Occupational Safety and Health also reports a lifetime prevalence rate of back pain or injury among nursing personnel of 35% to 80%. These statistics are highly significant because there is an emerging national and international nursing shortage. Currently there are 2.9 million nurses in the U.S. workforce, with an average age of 48. Up to 40% of practicing nurses are projected to retire in the next 5 years, and experts predict a deficit of at least 1 million nurses by the year 2020 (American Association of Colleges of Nursing, 2006; M. K. Murray, 2002; Unruh & Fottler, 2005; Williams et al., 2006). As many as 38% of nurses suffer from back pain severe enough to require time off from work during their careers, with up to 12% leaving the profession annually because of this issue. Prevention of nursing injury would therefore have a significant impact on the emerging nursing shortage (de Castro et al., 2006; Edlich et al., 2005).

Key Points

- Injury within the nursing workforce remains at near epidemic levels.
- Hierarchical task analysis (HTA) methods can be used to describe complex health care events and create an optimum task set for their performance.
- Implementation of a structured simulation-based intervention based on this task set was successful in improving patient transfer skills.

To reduce injury rates, a hospital-based training program is necessary to teach proper techniques and to monitor compliance. Development of a comprehensive, ergonomically sound program would require development of (a) a protocol that includes the optimum task set for moving patients; (b) an effective, standardized, and scalable training process; and (c) the ability to monitor program compliance in the clinical setting.

Before an effective simulation training program for patient transfer can be implemented, the ergonomic issues that constitute the transfer task must be clearly defined. The task analysis process used in ergonomic science fits well with this approach. *Task analysis* entails defining and describing either a job or the particular task or set of tasks within a job (Stanton, 2006). A subtype, *hierarchical task analysis*, has been used extensively in ergonomics research and fieldwork for more than 30 years (Stanton, 2006). As the name implies, hierarchical task analysis not only lists each step of a particular task but also analyzes and attempts to place each step in the order in which it should or could be performed (Annett, Cunningham, & Mathias-Jones, 2000; Shepherd, 1998; Stanton, 2006). The power of hierarchical task analysis results from its ability to facilitate description of individual or team behaviors by acknowledging that most tasks are comprised of "a sub-goal hierarchy linked by plans" (Stanton, 2006, 58). Because this approach deconstructs tasks into discrete components, it can be used not only to measure overall task completion but also to improve task performance by identifying problematic steps in the system or process.

Although nurses experience many different types of musculoskeletal loads in their work, the task of transferring patients is particularly implicated in causing injury (National Institute of Occupational Safety and Health, 2006). Currently, no standardized, universally accepted method accomplishes the overall outcome of "a safe patient transfer" while adhering to all ergonomic principles in prevention of caregiver injury. Partly, this deficiency exists because patient transfers require complex coordination of personnel and equipment and must be tailored to meet individual patient and facility needs. Additionally, moving a patient with heavy nonfixed limbs and a shifting center of gravity is not comparable to moving a static, gravity-centered load, such as a box or other solid object. Regulatory standards from the National Institute for Occupational Safety and Health tend to emphasize the "static" situation and are not designed specifically to address patient transfers. This makes the problem of preventing health care worker injury more difficult to remedy (National Institute of Occupational Safety and Health, 2006).

Didactic educational programs and single-focus interventions such as back belts have been demonstrated to be ineffective in reducing long-term injury rates (Edlich et al., 2001; Gatty, Turner, Buitendorp, & Batman, 2003; Karas & Conrad, 1996; Melton, 1983; Mitchell et al., 1994; Nelson et al., 2003; Taylor, 1987; Trinkoff, Brady, & Nielsen, 2003; Venning, 1988; Wassell, Gardner, Landsittel, Johnston, & Johnston, 2000; Yassi et al., 2001). An emerging educational approach that shows promise in increasing retention of skills is hands-on, scenario-based simulation training using a manikin (Ackermann, 2007; Crofts et al., 2007; Morgan, Cleave-Hogg, McIlroy, & Devitt, 2002; Wayne et al., 2006).