# Safe patient handling behaviors and lift use among hospital nurses: A cross-sectional study

Soo-Jeong Lee*, Joung Hee Lee

*Department of Community Health Systems, School of Nursing, University of California San Francisco, San Francisco, CA, USA*

## ARTICLE INFO

## ABSTRACT

*Purpose:* Patient handling is well known for the risk of musculoskeletal injury. Safe work practices are important to reduce risk of injury while performing patient handling tasks. This study investigated factors associated with safe patient handling behaviors and lift use among hospital nurses in the United States.

*Methods:* This study analyzed cross-sectional survey data from a statewide random sample of 221 hospital nurses in California who had patient handling duties. Safe patient handling behaviors and lift use were examined for the relationships with demographic characteristics, organizational safety practices, physical and psychosocial job factors, musculoskeletal symptoms, and perceptions about lift use and risk of injury.

*Results:* In multivariable logistic regression, high safe patient handling behaviors were significantly associated with a positive organizational safety climate (Odds Ratio [OR] = 2.76, 95% Confidence Interval [CI] 1.51–5.03), people-oriented culture (OR = 2.59, 95% CI 1.45–4.62), and ergonomic practices (OR = 1.67, 95% CI 1.04–2.67). High lift use (> 50% of the time when needed) were significantly associated with high lift availability (OR = 3.1, 95% CI 1.06–9.01) and positive perceptions about lift use (OR = 3.48, 95% CI 1.63–7.44). In bivariate analysis, high safe patient handling behaviors were associated with shorter height, non-White race, lower physical workload, lower job strain, higher job satisfaction, and less musculoskeletal symptoms.

*Conclusions:* The study findings underscore the importance of organizational safety practices and culture to promote safe work practices for patient handling injury prevention. Also, making lift equipment readily available and improving positive perceptions and experiences about lifts can be crucial to ensure the use of lift equipment.

## What is already known about the topic?

- Patient handling is well known for the risk of musculoskeletal injury among nurses.
- Safe work practices are important to reduce the risk of injury while performing patient handling tasks.
- Use of lifting equipment is an effective and necessary measure to reduce the risk of injury from patient handling tasks. However, lift use is not part of regular practices among many nurses.

## What this paper adds

- Positive organizational safety climate, people-oriented culture, and ergonomic practices were significant factors for safe patient handling behaviors among hospital nurses.
- High lift use was significantly associated with a high level of lift availability on the unit and nurses' positive perceptions about lift use.

## 1. Introduction

Patient handling, such as lifting, repositioning, or transferring patients and helping patients' mobility, is an integral part of nursing care. Yet, the high risk of musculoskeletal disorders from patient handling has been a major concern among nursing workers worldwide. Recently, Davis and Kotowski (2015) reviewed 132 studies conducted over the past 30 years and provided a comprehensive report on prevalence of musculoskeletal disorders in nursing workers (e.g., the mean annual prevalence rates of 55% for low back pain, 44% for shoulder pain, 42% for neck pain, 26% for upper extremity pain, and 36% for lower extremity pain). The review showed wide variations in the prevalence data across countries. In the United States (U.S.), each year 10,000–12,000 registered nurses sustain work-related musculoskeletal disorders resulting in loss of work time, and these nurses are away from work for a median 8–9 days (Bureau of Labor Statistics, 2013, 2014, 2015). Studies that analyzed workers' compensation data showed that

patient handling accounted for 31–72% of musculoskeletal disorder cases among hospital workers (Kim et al., 2012; Lipscomb et al., 2012; Pompeii et al., 2009). A study analyzing injury reports from 112 U.S. health care facilities reported a patient handling injury incidence rate of 11.3 per 10,000 worker-months (Gomaa et al., 2015). Unsafe patient handling can cause career-ending, devastating injuries and threatens the retention of a healthy nursing workforce (Dockrell et al., 2011).

To prevent patient handling injuries, organizations' policies and programs to ensure safe patient handing and individual workers' safe work practices are crucial. In particular, lifting equipment has been shown as an effective and necessary measure to reduce the risk of injury from patient handling (Burdorf et al., 2013; Nelson and Baptiste, 2004) and, therefore, use of lifting equipment is emphasized as a key component for safe patient handling practices. However, studies have shown that lift use is not part of regular practices among many nurses (Gomaa et al., 2015; LCWA Research Group, 2011; Lee et al., 2013a, 2015). Two U.S. studies using nationwide samples reported that only about one third of nurses with available lifting equipment used the lift frequently to perform patient handling (LCWA Research Group, 2011; Lee et al., 2013a). Similarly, a study in the Netherlands reported that only 27% of hospital nursing workers had sustained behaviors of using lift equipment (Koppelaar et al., 2013). In a study analyzing 4674 patient handling injury cases, Gomaa et al. (2015) reported that lifting equipment was not used in 82% of the injury cases where the lift use information was available. As such, studies show the large gap in safe patient handling practices. The lack of availability of usable equipment, time constraints, lack of workplace policy or specific protocol, lack of training, and lack of knowledge to use the lift have been identified as the main barriers to the use of lifting equipment (Koppelaar et al., 2009, 2013; Schoenfisch et al., 2011). In addition to using appropriate lift equipment, a range of work behaviors such as assessment of the patient and risk, assessment and correction of the physical environment (e.g., space or obstacles), getting necessary help from coworkers and co-operation of the patient, and use of good body mechanics are also important to perform the patient handling task safely (Lee et al., 2010; Nelson and Baptiste, 2004). However, in the literature on safe patient handling behavior, most studies focused on lift use behavior alone, and only a few studies investigated safe patient handling practices encompassing multiple behaviors (Lee et al., 2010).

Studies suggest that individual workers' safety practices are affected by organizational and psychosocial job factors. In particular, the workplace safety climate—workers' shared perceptions about the safety of the workplace and organizational safety practices, including management commitment and support and safety communication—has been associated with higher safe work practices in various worker populations in health care, construction, and other industries (Arcury et al., 2012; Dutra et al., 2014; Felknor et al., 2000; Lee et al., 2010; Morrow et al., 2010; Seo, 2005; Zohar, 2010). In a study by Lee et al. (2010), safety climate was found to be the strongest factor associated with safe patient handling behaviors among critical care nurses. The study also found that job stress measured by effort-reward imbalance was significantly associated with safe patient handling behaviors, suggesting perceptions about job play a role in safety practices. However, empirical evidence for an independent relationship between job stress and safety practices is mixed or limited in the literature (Bronkhorst, 2015; Gershon et al., 1995; Masia and Pienaar, 2011; Seo, 2005). Meanwhile, recent studies suggest the role of job satisfaction in safety practices (Masia and Pienaar, 2011; Wei et al., 2016) and higher job satisfaction may improve engagement in safety practices, but the relationship has never been examined with safe patient handling behaviors. On the other hand, the role of risk perception has been suggested by theories (Rogers, 1975; Rosenstock et al., 1988), but most studies failed to find a significant relationship with safe work practices (Lee et al., 2010; Seo, 2005; Rickett et al., 2006).

To improve and ensure safe work practices, better understanding is needed in regard to factors affecting safe patient handling practices of hospital nurses. The purpose of this study was to examine safe patient handling behaviors and lift use among hospital nurses and identify associated factors. Lift use behavior is included in safe patient handling behaviors, but we investigated lift use as a separate outcome as well, considering its importance as a key indicator. We conducted a comprehensive examination by including individual, job, and organizational factors, perceptions about work and risk, and musculoskeletal symptom and injury experiences. Fig. 1 presents the conceptual framework of this investigation (Lee et al., 2013b).

## 2. Methods

### 2.1. Study design and sample

This study was a statewide, cross-sectional survey in a random sample of 2000 registered nurses in California, United States. The sample was selected from the 2012 California Board of Registered Nursing list of registered nurses with an active license. The sampling was stratified by nine regions of California to ensure regional representation, by referring to the method used by Spetz et al. (2011). The sample size in each stratum was selected to be proportional to the size of the registered nurse population by region.

The study collected data using both postal and online surveys from January 2013 to July 2013. The online survey was developed using Qualtrics survey software (Qualtrics, Provo, UT). We initially mailed the survey packets, enclosing the study information letter, study questionnaire, and return envelope. The information letter included instructions on the response option of online survey format; unique username and password were provided to each respondent. Reminders were sent at 2-week intervals up to four times and the 3rd reminder enclosed another copy of the study questionnaire. As an incentive, a $50 gift certificate was given to 20 respondents by random drawing. All study procedures had the prior approval of the Committee on Human Research at the University of California San Francisco.

Among the 2000 nurses, a total of 526 nurses responded, a response rate of 26.3%: 416 (79.1%) returned the paper survey, 93 (17.7%) completed the online survey and 17 (3.2%) contacted the researcher by phone or email. Of the respondents, 424 were currently employed and 284 (67.0% of current nurses) were working in hospital settings. Of the hospital nurses, 230 (81.0%) had patient handling duties. In the data analysis, we excluded eight nurses working in neonatal intensive care units based on the different nature of patient handling and one case where the outcome variable of safe patient handling behavior was missing. Consequently, 221 hospital nurses who performed patient handling tasks served as the final sample for the data analysis.

### 2.2. Study variables and measures

The outcome variables of the study were safe patient handling behaviors and the use of lifting equipment. Independent variables included demographics, employment characteristics, physical workload, psychosocial work factors, organizational safety practices, and perceptions about lift use and injury risk, and work-related injury or symptoms.

#### 2.2.1. Outcome variables

Safe patient handling behaviors were measured by the 15-item Safe Patient Handling Behavior (SPHB) measure developed by Lee et al. (2010). The SPHB measure asked how often the nurse engaged in safer practices when performing patient handling tasks (e.g., patient and environment assessment, corrective actions, use of a lift or transfer aid, ask for assistance from coworkers, and use of good body mechanics). The SPHB measure used a 6-point Likert-type scale (1 = never to 6 = always); the SPHB score was computed as a mean score of the items. Higher SPHB scores indicated safer behaviors. The Cronbach's alpha was 0.86 in the survey sample. As the safe patient handling behavior variable