Understanding Risks of Workplace Injury in Labor and Delivery

Jaynelle F. Stichler, Judd L. Feiler, and Kimberlie Chase

Correspondence
Jaynelle F. Stichler, DNS, RN, FACHE, FAAN, P.O. Box 28278, San Diego, CA. jan.stichler@sharp.com

ABSTRACT

Objectives: To understand nurse and other staff perceptions about care activities in labor and delivery (L&D) that were performed with high frequency, required high exertion, and had the greatest potential to cause injury and to determine what personal characteristics might be related to the caregiving tasks with potential for injury.

Design: This exploratory study employed a mixed methods design using qualitative open-ended questions and quantitative surveys administered in three different times ($n = 56$, 58, and 58).

Setting: A 22-room L&D unit in a women's hospital with 8,500 annual deliveries.

Participants: Nurses and assistive staff.

Results: High-risk tasks were classified in three categories. High-exertion tasks included (a) moving patients in labor, delivery, recovery (LDR) beds to other locations; (b) breaking delivery beds and applying stirrups; (c) assisting dependent patients with mobility in bed; and (d) pushing medical equipment and delivery carts. Awkward posture tasks during patient care included (a) listening for heart tones; (b) performing difficult vaginal exams; (c) keeping the fetal head off of the cord during cord prolapse; and (d) assisting with epidurals. Culture of safety tasks included (a) physician requests to conduct patient care tasks that put staff at risk for injury; (b) providers ignoring broken equipment in the environment; (c) responding to emergent/urgent situations without regard to self-posturing to prevent injury; and (d) holding patients' legs during delivery at the physician's direction. Several significant correlations were noted between demographic variables and high potential for risk items.

Conclusions: This study provides the first information about the caregiving tasks L&D nurses perceive to be risky for personal injury because of their high frequency and exertion or breaches in the culture of safety.

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Jaynelle F. Stichler, DNS, RN, FACHE, FAAN, is a professor in the School of Nursing, San Diego State University and a research consultant for the Sharp Mary Birch Hospital for Women & Newborns, San Diego, CA.

Judd L. Feiler, PT, MS, is a physical therapist in the Sharp Memorial Sports Medicine Center and lead therapist for the Injury Prevention Program, Sharp Metropolitan Campus, San Diego, CA.

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Typically, we do not think of nursing as hazardous duty, but there is a large body of evidence that demonstrates that nursing is a profession at risk (U.S. Bureau of Labor Statistics, 2006). Although injuries such as needle sticks, exposure to infectious diseases or noxious chemicals, and mental stress are more commonly recognized as potential hazards, nurses are among the workers at highest risk for musculoskeletal disorders (MSDs). The U.S. Bureau of Labor Statistics lists nursing personnel, including registered nurses (RNs), as sixth in a ranking of occupations at risk for strains and sprains. Nurses, nurses' aides, orderlies, and attendants were listed among the top 10 occupational groups reporting the most cases of workplace injuries and illnesses between 1995 and 2004. Only truck drivers and manual laborers (second) exceeded nurses' aides, orderlies and attendants (first), and nurses (fifth) in the number of reported nonfatal injuries with construc-

tion workers ranking eighth (U.S. Bureau of Labor Statistics).

In 2008, 64,300 occupational MSD cases were reported nationally in the health care industry resulting in at least one day lost from work. These cases were the result of care providers sustaining an injury or illness in the provision of care to a patient or a resident of a health care facility. The overwhelming majority of these cases were the result of overexertion resulting in sprains, strains, and tears. Nursing aides, orderlies, and attendants incurred 52% of the MSDs whereas nurses incurred 16% and home health aides incurred 6% of all injuries occurring among health care workers (U.S. Bureau of Labor Statistics, 2010). The incidence of workplace injuries among nurses and other health care providers is no small problem, and it carries enormous personal consequences for the injured nurse who may no longer be able to practice

Among all occupational groups, nurses have the highest incidence of work related back injuries.

after sustaining a catastrophic injury or sustaining a number of repetitive injuries.

Recognizing the risk to nurses, the American Nurses Association (ANA) developed the Handle with Care campaign to inform nurses of the risks in patient care activities and to launch preventive education and training and increased use of patient-handling assistive devices and equipment (ANA, 2004). The ANA published a position statement in 2008, *Elimination of Manual Patient Handling to Prevent Work-Related Musculoskeletal Disorders*, supporting actions and policies among employers that would eliminate manual patient handling and promote the use of assistive equipment with increased employee training on the equipment and devices, designated resource specialists for safe patient handling, and enhanced patient assessment upon admission. Additionally, the position statement called for nonpunitive reactions to reported incidents of work-related injuries to ensure that the employers' policies restricting manual patient handling would actually reduce the risk of MSDs (ANA, 2008).

The ANA's continued efforts included a news release supporting The Nurse and Health Care Worker Protection Act of 2009 (H.R.2381), which informed members of Congress about the patient care risks to nurses and all health care workers and outlined steps to reduce musculoskeletal injuries resulting from moving, lifting, and repositioning patients. The news release also launched the ANA's Handle with Care Recognition Program, which recognized health care organizations that exemplified and sustained high standards for program planning, policy creation, and training for employees on safe patient-handling techniques and assistive devices for at least 3 years (ANA, 2009). There is much work to do to accomplish the goals and standards set forth by the ANA.

Although much has been written about the development of safe patient-handling programs for the acute care hospitals, rehabilitation centers, and long-term care facilities, there is little knowledge about such programs for labor and delivery (L&D) or other maternity and newborn programs (Nelson, 2006, 2008; Nelson & Baptise, 2004). In this article, we discuss the findings of an exploratory study designed to understand employ-

ees' perceptions about care activities in an L&D clinical area that had the greatest potential to cause employee injury. It is intended that the findings of the study will be used to develop an educational and unit-based change process to increase staff awareness about the potential for personal injury and to change the departmental culture highlighting personal safety as a priority to reduce the number of employee injuries.

Two research questions guided the work of the study: (a) From the nurses' perspective, what are the caregiving activities that are performed with the greatest frequency, require high exertion, and have the greatest potential to cause personal injury in the labor-delivery-recovery (LDR) unit? (b) What personal characteristics of the nurses and assistive personnel might be related to the caregiving tasks with the greatest potential for injury?

Background

In their patient care activities, nurses must twist, kneel, stoop, reach, pull, push, scoot, slide, turn, stretch, climb, and lift, all repetitive motions and dynamic movements that can lead to sprains, strains, and tears of muscles (Nelson, 2006). Furthermore, some nurses are required to stand for long hours at the patient's side in a form of static work leading to muscle demands for contraction and tension with constriction of the veins reducing blood flow and resulting in an accumulation of lactic acid leading to muscle pain (Daggfeldt & Thorstensson, 2003). Nurses standing at the patient's bedside and twisting or laterally flexing the trunk of the body to listen to the heart and lungs, take the blood pressure, change dressings, or reposition the patient in bed are subjecting themselves to more strenuous muscle strain than bending forward (McGill, 2007). Yet these movements are the everyday work of the nurse who likely never thinks that these repetitive motions could create a problem for his or her body.

Other health care professionals such as physical and occupational therapists are taught early in the education and orientation to their profession to protect their bodies during patient interventions and can be observed constantly repositioning themselves or the treatment tables to maintain body postures that prevent personal injury. Nurses typically are taught how to use "good" body mechanics in their educational experience including manual patient-handling and lifting procedures and are rarely introduced to the

Kimberlie Chase, RN, is the manager of the labor and delivery unit, Sharp Mary Birch Hospital for Women & Newborns, San Diego, CA.

concept of seriously protecting themselves from injury while providing care to patients (Potter & Perry, 2008; Powell-Cope, Hughes, Sedlak, & Nelson, 2008). Nurses often engage in patient-handling tasks that are typically performed manually and repetitively such as lifting patients, scooting them up in bed, repositioning them from side to side, transferring them from bed to stretcher or chair, and engaging in interventions and procedures without regard to first repositioning the height of the bed or changing the nurses' body posture to protect themselves from personal injury. Yet the continuous and repeated performance of patient caregiving tasks over a career predisposes the nurse to personal injury (ANA, 2004).

We conducted a review of the literature using several data bases such as PubMed and CINAHL. Nearly 50 articles were reviewed for this study, and not one evidence-based or opinion article included data related to employee injuries in L&D units or for any unit in a women's and newborn hospital. This absence of evidence about employee injuries in L&D makes this study important and significant.

The Scope of Health Care Injuries in the Workplace

Data from the U.S. Bureau of Labor Statistics (2006) show injuries and illnesses involving days away from work accounted for 5% of all nonfatal work injuries of all occupations between 1995 and 2004, and the number of workplace injuries and illnesses among health care workers is high in comparison to other occupational groups. It has been reported that women sustained more than 90% of the workplace injuries for the nursing, psychiatric, and home health aides, but this is likely because of the high concentration of females in this occupational group (Hoskins, 2006).

Back Injuries. Among all occupational groups, nurses have the highest incidence of work-related back injuries with an estimated rate of 12.6 per 100 workers. Nurses and nursing assistants working in nursing homes had an incident rate of 181.6 per 10,000 injuries for back injuries resulting in lost days of work, and hospital nurses and nursing assistants had an incidence rate of 90.1 per 10,000. These rates for nursing home workers are more than double than the rates for construction workers, and hospital workers have rates 29% higher than construction workers (U.S. Bureau of Labor Statistics, 2003).

> **The number of hours that nurses work, the number of jobs they hold concurrently, and the element of fatigue have been shown to contribute to workplace injuries.**

Most concur that nurses incur back injuries primarily by transferring patients from surface to surface or when lifting patients (a single event or cumulative lifting). The back injuries are often caused by nurses lifting or transferring patients in uncoordinated efforts with two or more people. Injuries also occur when lifts or transfers are attempted by injured or fatigued nurses, engaged by pairs of nurses lifting with height disparities creating an unequal distribution of the patient's weight, and with lifts of uncooperative patients who cannot assist. The trend for more obese patients also adds to the lift burdens for nurses (Nelson & Baptise, 2004).

The National Institute of Occupational Safety and Health (NIOSH) recommends a weight limit of 20.7 kg (35 pounds) for women based on the ability of women to lift a stationary box that was 14 inches wide with handles approximately 10 inches off the surface (Collins, 2011). Because patients are not static, inanimate objects, this criterion for lifting cannot be applied to nurses. Based on various routine techniques used by nurses to transfer patients between bed and wheelchair, wheelchair and commode, and bed to chair using one-person and two-person methods, University of Ohio investigators reported that all of the methods of transferring and repositioning the patient placed the nurse in the high-risk group for back injury because of spinal load pressure. This study demonstrated that proper body mechanics does little to prevent cumulative or direct back injuries (Marras, Davis, Kirking, & Bertsche, 1999).

Musculoskeletal Disorders. In a study of occupational injuries, illnesses, and fatalities among health care workers, MSDs were the most common type of nonfatal injury and represented 54% of all injuries (Hoskins, 2006). Musculoskeletal disorders are injuries of muscles, nerves, tendons, joints, cartilage, or spinal discs and are generally the result of overexertion or repetitive motions as contrasted to injuries resulting from slips, trips, falls, or other such accidents. Slips, trips, and falls are a significant cause of employee injuries with falls as the second leading injury among health care workers.

Low-back complaints are the most commonly reported MSD with a prevalence of 30% to 60% in some settings (Trinkoff, Lipscomb, Geiger-Brown, Storr, & Brady, 2003), and they are often the result of heavy lifting or patient transfers requiring sudden movements from nonneutral postures. Nurses also have complaints of neck (30%–48% of nurses) and shoulder pains (43%–53% of nurses) resulting from bending, twisting, lifting, awkward posturing, stooping, and other manual tasks associated with patient care (Bos, Krol, & van der Star, 2007).

Most efforts to reduce MSDs have continued to focus on educating the nursing student and practicing nurse on body mechanics and proper body positions and postures for lifting, but this approach has not demonstrated effectiveness in reducing the overall rates of MSDs among nurses (Hignett, 2003; Nelson, 2003, 2006). According to Hignett (2003) who conducted a systematic review of 880 papers and reported on the findings of 63 studies, multifactor interventions based on risk factors related to patient-handling activities were the most successful in reducing MSDs, whereas interventions based solely on technique training had no impact on working practices or injury rates.

Possible Causes of Workplace Injuries

There are a number of causes of injuries among nurses, and the literature is replete with evidence about the effect of manual patient handling and mobilization as the primary cause of nurses' injuries (Hignett, 2003; Nelson, 2003, 2006). There are other mitigating factors as well that should be considered that likely exacerbate the problem: (a) the advancing average age of the nurse; (b) nurse fatigue related to shift work, the number of hours worked, and the number of concurrent jobs; (c) noncompliance with organizational policies related to injury prevention; (d) organizational demands for more workload and productivity; (e) absence of a safety climate; and (f) lack of available lift-assistive devices because of the capital cost of lift equipment (Nelson, 2006).

Impact of Workplace Injuries

Workplace injuries have serious consequences for the injured person, potentially for the patient, and for the organization. According to Nelson (2003), nearly 52% of nurses who have sustained a MSD complain of chronic pain. Unfortunately, many nurses must take a prolonged leave of absence after they have sustained a lower back injury, and

12% reported that they were unable to continue practicing nursing because of back pain. In a survey sample of RNs ($N = 503$), 38% reported suffering severe back pain resulting in being placed in a workers' compensation program (Owen, 2000). Some nurses request a transfer from their current unit to a patient care area with less demanding physical requirements or change professions all together. Not only does the loss of nurses due to injury affect the number of available nurses, but it also affects the quality of patient care with the loss of expert knowledge and the upset of the unit culture and staff morale.

Organizationally, the cost of employee injuries resulting in workers compensation claims has been estimated to be an average of $25,450 to $38,280 per RN (Morgan & Chow, 2007). Other researchers reported observed average costs per staff related for musculoskeletal injuries as more than $160,000 per 100,000 hours worked (Siddharthan, Nelson, & Weisenborn, 2005). These authors described significant cost savings and a reduction of employee injuries resulting in workers compensation claims when implementing multifaceted safe patient-handling and mobilization programs, multidisciplinary approaches to employee injury cases, and comprehensive ergonomic plans. Many hospitals view ergonomics and safe patient-handling and mobilization programs as means to prevent MSDs and to improve working conditions without realizing that potential financial return on their investment. Not only is there a solid business case for patient care ergonomic interventions, but there is also a solid human case to prevent debilitating and career-limiting injuries.

Evidence Specific to Labor and Delivery Units

Although there were no evidence-based or opinion articles related to caregiving and task-related employee injuries in L&D units, these units have a high potential for musculoskeletal injuries. L&D nurses must manage heavier-than-average patients (average pregnancy weight gain is 25–35 pounds in addition to base weight) and obese patients; move and reposition patients after epidural anesthesia; transfer patients from the L&D bed to the operating room table; place patients legs into stirrups for delivery and adjust the height and angle of the stirrups; lean and stretch to examine patients vaginally or to find fetal heart tones; move and "break" beds in preparation for

delivery; sustain awkward positions in emergency situations or when assisting with spinal anesthesia; move delivery carts, instrument trays, and case carts; bend, stretch, and turn the torso to reach electrical outlets; and move in a small room with numerous people and equipment.

Methods

This exploratory study employed a mixed-methods study design using qualitative open-ended questions with L&D nurses and assistive personnel (transport orderlies and nurse assistants) to address the two research questions: (a) From the nurses' perspective, what are the caregiving activities that are performed with the greatest frequency, require high exertion and have the greatest potential to cause personal injury in the labor-delivery-recovery (LDR) unit at Sharp Mary Birch Hospital for Women & Newborns (SMBHWN); (b) What personal characteristics of the nurses and assistive personnel might be related to the caregiving tasks with the greatest potential for injury? Assistive personnel as well as nurses were included in the study because the literature indicates a high rate of injury among both categories of workers. Institutional Review Board (IRB) approvals were obtained from Sharp Health-Care and San Diego State University before data collection commenced.

Setting

The research was conducted at SMBHWN that includes a 22-bed LDR unit in a large tertiary care, free-standing women's hospital located in San Diego, California. Nurses and physicians are the only providers with assistive personnel such as nursing assistants, delivery technicians, and transporters. Certified Nurse Midwives do not have privileges for deliveries at this hospital. Approximately 8,500 deliveries occur at SMBHWN with a total 35% Cesarean section rate. The high Cesarean rate is important because patients are transferred from the LDR to the operating suites located on the same floor for the Cesarean delivery. Patients are also transported from the Assessment and Triage Unit on a different floor to be admitted to the LDR unit during labor. Delivery case carts and other equipment are moved into and out of the LDRs by nurses and assistive personnel.

Existing data indicated that between January 2008 and June 2010, there were 74 injuries in the L&D unit, the highest number of injuries among the patient care units in the SMBHWN. Thirty-four percent (34%) of these injuries resulted in worker's compensation claims. Eighty-five percent (85%) occurred in the actual LDR room with lumbar spine injuries most frequently reported followed by shoulder injuries and wrist/hand injuries. These injuries represented a total of 677 days out of work for employees or an average of 7.5 days per injury, and 791 days of restricted work activity or an average of 8.8 days per injury. The average medical cost of just one nurse with a sprain and strain injury was approximately $13,500. In the aggregate, the injuries incurred in this 18-month period represented an estimated $339,660 in direct medical costs. It is estimated that direct staffing and replacement costs for paying the injured nurse for the days out of work or the restricted work activity and for replacing the injured nurse in the work setting ranged between $1,158,140 and $1,585,280. Clearly, there is a significant personal cost to employees and financial cost to hospitals for injuries incurred on the job, and a potential for return on investment for safe patient-handling initiatives.

Data Collection

Participants were told about the study in staff meetings and given an introductory letter explaining the study aims, data collection methods, and how the participants could voluntarily participate or withdraw participation at any time. Signed consent was waived per IRB approval and completion of the study questionnaire implied consent. All of the study questionnaires were completely anonymous and did not require any personal identifiers for completion.

There were four separate data sets for the study that were collected three different times including (a) a 15-question demographic survey providing background information about the participants; (b) a survey with four open-ended questions; (c) a Content Validation Rating Scale that summarized the responses to the open-ended questions into categories that the staff used to validate the category labels and the subset of items developed from the content analysis from the survey questionnaire; and (d) a Task Risk Assessment tool listing patient care tasks for the staff to rank for the frequency of the task, the physical stress (exertion) of the task, and the potential risk for employee injury.

Phase 1 – Open-Ended Survey

The introductory letter explaining the study and the open-ended survey questionnaires were distributed to the nursing personnel during a staff meeting with instructions as to how to complete

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Holding patient legs at the request of physicians is a high-risk task with potential for serious injury to the nurse.

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the survey and where to deposit the completed surveys. The open-ended survey included four questions: (a) what are some of the environmental or physical factors that have the greatest potential to cause injury to yourself or others; (b) what are the other factors that occur in the process of giving care to patients that have the potential to injure you or others; (c) what are the three top factors that can contribute to an injury to yourself; and (d) what do you think might reduce the potential for employee injuries in L&D?

A content analysis of the participants' responses to the items listed for each of the open-ended questions was conducted. The three researchers independently reviewed each question's responses, identified common themes or categories among the responses, and tallied frequency counts for the items in each identified categories. The three researchers then met together to discuss the categories that each had identified individually and reported the name of the category and the frequency count. If there were discrepancies among the three researchers, the items were reviewed one by one until agreement was reached for the category label and the items within the category. At this point, eight categories were identified and a frequency count of each of the representative items was conducted.

Phase 2 –Content Validation Rating Scale

A Content Validation Rating Scale was then created of each of the categories and items with the highest frequency counts. At a staff meeting, the staff was asked to participate again in the study by validating the investigators' interpretation of their responses and the naming of the top categories with the greatest potential to cause personal injury. A Likert-type scale was used to rate each category from *strongly agree* (4) to *strongly disagree* (1) with a nonqualifier of *don't know* (0) and a "Remarks" column. The staff ranked each item under each category as to how strongly they agreed that the item represented possible sources of injury for nurses working in L&D. It was predetermined that ranked items that did not meet the preset criteria of a mean of 3.0 on the 4-point Likert-type scale would be eliminated.

Phase 3 – Task Risk Assessment

The categories that met the preset criteria of a mean of 3 and with the highest frequency counts were then placed on a Task Risk Assessment tool adapted from a previously published tool (Nelson, 2006) for the staff to rate in terms of (a) frequency of the task, (b) physical stress of the task (exertion), and (c) potential risk for employee injury. The participants were directed to rate each item for the frequency, exertion and potential risk of the tasks. The ratings were: 10 (*high*), 5 (*moderate*), 1 (*low*), and 0 (*no*) risk in terms of frequency, exertion, and potential risk. The mean score for each item for frequency, exertion, and potential risk was then calculated. Items that were rated highest by the nurses as high frequency, high exertion, and high potential for risk were then categorized. The participants completed the demographic survey at this point as well.

It should be noted that the participants may not have been the same in all three data collection phases. Different participants may have responded to the Open Ended Survey ($n = 56$), the Content Validation Rating Scale validation tool ($n = 58$), the Task Risk Assessment ($n = 58$), but all participants were employed in the same L&D unit where there is a total of 156 nurses and assistive personnel.

Data Analysis

The data from the demographic surveys was analyzed using descriptive and inferential statistics depending on the level of measurement for each item. Interval and ratio demographic data was correlated with the task risk assessment data discussed later in this section.

Open-Ended Survey

The qualitative open-ended question surveys were completed by the participating nurses ($N = 56$) and yielded 150 different responses for Question 1, 122 responses for Question 2, 138 responses for Question 3, and 99 responses for Question 4 for a total of 509 identified care giving tasks. In the first round of analysis of the four open-ended questions, eight major categories were identified by the investigators from the 509 caregiving tasks as follows: (a) moving patients in beds, (b) breaking the beds for delivery, (c) assisting dependent patients in bed, (d) pushing equipment and delivery carts, (e) assisting during delivery, (f) responding to emergencies, (g) culture of safety, and (h) environmental issues and situations that led to a compromised body position or awkward positions.

These categories were validated by the staff using the Content Validation Rating Scale previously described. Staff then rated each of the eight categories on the Task Assessment Tool previously described.

The findings from this step were very reassuring that the researchers had captured the high-risk items. After this round of analysis, it was decided to collapse the eight categories into three major categories of injury risk factors that reflected evidence in the review of the literature and more accurately summarized the data as follows: (a) high-exertion tasks, (b) awkward postures required for patient care, and (c) culture of safety (pressure from physicians or another nurse to engage in a risk prone activity). Additionally, the items that scored the highest frequencies for the Task Risk Assessment Tool were assigned under each category as follows:

High-exertion Tasks. This category was defined as any activity that pushes the limit of human capabilities (Nelson, 2008) and included the top items noted on the Task Risk Assessment Tool as follows: (a) moving patients in LDR beds to the operating room or other locations; (b) breaking delivery beds and applying stirrups; (c) assisting dependent patients with mobility in bed (turning, positioning); and (d) pushing medical equipment and delivery carts.

Awkward Postures During Patient Care. This category was defined as a situation that presents a pressure on the nurse to perform a task that places him or her in a compromised body position that could increase the potential for injury and included the top items noted on the Task Risk Assessment Tool as follows: (a) listening for heart tones, (b) performing difficult vaginal exams, (c) keeping the fetal head off of the cord in cord prolapse, and (d) assisting with epidurals.

Culture of Safety. This category was defined as the general awareness of staff and physicians related to ensuring a safe work environment and keeping all providers safe from injury. This category included the top items noted on the Task Risk Assessment Tool as follows: (a) physician attitudes about staff safety such as pressure to perform patient care tasks that put staff at risk for injury or perform tasks in a hurried, rushed manner without regard for the nurses' safety; (b) providers ignoring broken equipment in the environment without implementing appropriate reporting mechanisms

in place; (c) responding to emergent or urgent situations without regard to safe patient mobilization or self-posturing to prevent injury; and (d) holding patients' legs during delivery at the physician's direction.

Results from the Final Analysis of Injury Risk Factors

The final sample ($N = 58$) consisted of Registered Nurses (93%) and other assistive personnel (7%) such as clinical nurse's assistants or medical assistants. Demographic data is presented in Table 1. All of the participants were female. Eighty-one percent (81%) of the sample was White with 8.6% Asian, 6.9% Hispanic, and 1.7% reporting as other. The participants worked full-time (63%), part-time (17.2%), per diem (17.2%) or other (5.2%) and had a mean age of 35.38 years ($SD = 11.04$), a mean of 9.35 years as an RN ($SD = 10.68$), and a mean of 6.65 years working at SMBHWN ($SD = 7.43$). The nurses reported that they had attended a mean of 1.62 (2.39) of formal classes or in-services on preventing employee injury and reported that they had been injured in the work environment for a mean of 0.91 ($SD = 1.29$) times. Eighty-six percent (86.2%) denied having any physical disabilities, illnesses, or pregnancies that prevented them from providing full patient care.

Correlations Among Demographic Data and High-Frequency, High-Exertion, and High-Risk Tasks

There were several demographic items that were significantly correlated with the high-frequency, high-exertion, and high potential risk items in the three final categories (Table 2). The demographics demonstrating the most correlations were (a) year of first degree (an indicator of age), (b) years as an RN, (c) number of jobs at other hospitals (in addition to the current position at SMBHWN), and (d) years at SMBHWN.

Year of First Degree. The year of first degree is a proxy for age and was significantly correlated with the exertion of "repositioning epiduralized patients in bed" ($r = .305$, $p = .05$), exertion of "changing bed linens in an occupied bed" ($r = .452$, $p = .01$), and the frequency of "transfer of patients from bed to chair/toilet" ($r = -.293$, $p = .05$). These findings suggest that the older nurse may find repositioning the epiduralized patient in bed and changing the occupied bed as more exerting. The negative correlation between year of first degree

Table 1: Demographic Data (N = 58)

	n(%)	M	SD	Range
Registered Nurses (RNs)	54(93)			
Assistive personnel	4(7)			
Female	58(100)			
Ethnic group				
White	48(82.8)			
Asian	5(8.6)			
Hispanic	4(6.9)			
Other	1(1.7)			
Work status				
Full-time	37(63)			
Part-time	10(17.2)			
Per diem	10(17.2)			
Other	3(5.2)			
Age in years		35.38	11.04	22–59
Years as an RN		9.35	10.68	0–40
Highest degree earned				
Associate Degree in Nursing	21(36.4)			
Diploma	2(3.7)			
Bachelor of Science in Nursing	30(50.9)			
Bachelor of Arts/Bachelor of Science/Other	5(9.1)			
Years at Sharp Mary Birch Hospital for Women & Newborns		6.65	7.43	0–28
Number of formal classes on preventing employee injuries		1.62	2.39	0–12
Number of times injured at work		0.91	1.291	0–5
Number of jobs at other hospitals		0.32	0.869	0–5
No physical disabilities, illnesses or pregnancies preventing them from providing full patient care	50(86.2)			

and frequency of "transfer of patients from bed to chair/toilet" may be explained by the nearly 68% epidural rate for the SMBHWN where the patient would be unlikely to transfer from the bed at all.

Holding Patients' Legs During Delivery. It should be noted that "holding patients legs during delivery" (high frequency, exertion, and potential risk) was significantly correlated with "year of first degree" ($r = .426$, $p = .01$ for exertion); "years as an RN" ($r = -.375$, $p = .05$ for frequency; $r = -.375$, $p = .01$ for exertion and $r = .482$, $p = .01$ for risk); "years at SMBHWN" ($r = -.385$, $p = .01$ for

frequency and $r = -.402$, $p = .01$ for exertion). Although there is a department rule that nurses should not engage in "holding patient's legs during delivery," many nurses feel compelled to do so when asked by the physician in front of the patient's family and in the situation where the fetus is showing distress. These negative correlations between "holding patient's legs during delivery – frequency and exertion" and "years as an RN" may indicate that the more experienced nurse recognizes the personal risk of holding the patient's legs and does not engage in the activity or does so less frequently or in a manner that causes less

Table 2: Correlations with Demographic Variables

	Year of First Degree (proxy for age)	Years as an RN	Years at SMBHWN	Number of other jobs
Exertion of repositioning epiduralized patients in bed	.305*			
Exertion of changing bed linens in an occupied bed	.452**			
Frequency of transfer of patients from bed to chair/toilet	−.293 *			
High-frequency, exertion, & potential risk – holding patients legs during delivery	.426** (exertion)	−.375* (frequency); −.375** (exertion); & .482* (exertion)	−.385** (frequency) & −.402** (exertion)	
Pushing delivery carts				.367** (frequency)
Location of gloves/gowns in delivery room				.31* (exertion) & .44** (risk)
Hanging IVs				.306* (risk) & .296* (exertion)
Moving obese patients with impaired mobility				−.307* (exertion)
Exertion of changing bed linens in an occupied bed				−.313* (exertion)

*$p \leq .05$
**$p \leq .01$

exertion. Nurses who had longer time at SMBHWN displayed the same pattern and may reflect knowledge of the policy related to "holding patient's legs during delivery."

Number of Jobs at Other Hospitals. Another finding of note relates to nurses who are employed at other hospitals while also employed at SMBHWN. This variable is important because the literature indicates a significant correlation between fatigue and workplace injuries. The "number of jobs at other hospitals" was significantly correlated with the frequency of pushing delivery carts ($r = .367$, $p = .01$); location of gloves/gowns in the delivery room for exertion ($r = .31$, $p = .05$) and for risk ($r = .440$, $p = .01$); hanging IVs for risk ($r = .306$, $p = .05$) and for exertion ($r = .296$, $p = .05$). The "number of jobs at other hospitals" was also correlated with the exertion of moving "obese patients with impaired mobility" ($r = −.307$, $p = .05$) and

the exertion of changing bed linens in an occupied bed ($r = −.313$, $p = .02$). These findings indicate that even nonlifting patient care tasks can be perceived as risky and exerting for nurses who may be more fatigued because of working multiple jobs. It is surprising to note the negative correlations between the number of jobs and the exertion of moving "obese patients with impaired mobility" and "changing bed linens." Could it be that these multijob nurses have developed methods to manage these high-exertion tasks?

Discussion

Items falling under the categories of "high-exertion tasks" and "awkward postures required for patient care" require further exploration with the Ergonomic Specialist and the nursing staff to identify body positions that may be more ergonomically correct to perform these procedures. Although nurses generally perform these procedures

routinely and without thought to preventing injury to themselves or to their patients, the literature supports that repetitive motions create the greatest opportunity for sustaining an injury from muscle strain or sprain. Enhancing staff awareness of this potential risk and of body positions that can prevent such strains and sprains will likely reprogram the nurses to think "safety first" before performing these routine tasks.

Items falling under the category of "culture of safety" require a concentrated and planned strategy to change the unit's culture around employee safety as the number one priority. This thinking is a shift from the "patient first" (at all costs) mantra that is also a critical element of quality care, but employee safety and patient care can coexist as priority one strategies. Crucial conversations must be held with interdisciplinary partners to prevent the occurrence of requesting nurses to "hold the patient's legs during delivery" in the family's presence and ways to involve the family in the patient's care can also reduce the potential for nurse injury. Nurses who do engage in holding the patient's legs at the physician's direction may do so repetitively increasing the possibility of muscle strain and sprain; whereas family members will perform this procedure once or twice in their experience.

Staff must be reminded that broken equipment left unattended is a potential hazard for themselves or coworkers and are asked to take immediate action to tag, report, and isolate the broken equipment until it can be repaired or eliminated. Time is of essence in L&D, and many situations seem to take on an emergent nature creating the potential for nurses to forget the "safety is priority one" mantra. Staff discussions about how to manage patient care safely in all situations, even emergent situations are critical. The use of safety huddles or other pre- and postevent team discussions to anticipate potential patient care situations that can lead to injury are great ways to enhance awareness and create plans to prevent employee injury.

Limitations

The study had several limitations that may have affected the findings. The respondents in the three phases of the study may not have been the same participants, but the samples were volunteers from the same population of all L&D nurses and assistive personnel. The sample sizes were relatively small and representative of only one hospital's nurses; therefore the findings are not generalizable to any other setting. The samples from the

three different phases included a mix of RNs and a small number of assistive personnel that is typical of most L&D units, but the findings cannot be generalized to the RN population alone. Because the majority of participants were RNs as compared to a very small number of assistive personnel, it was impossible to compare differences among the two groups; therefore, their responses are aggregated together.

The survey instrument used to validate the qualitative categories was developed specifically for this study. The Task Risk Assessment tool is similar to those described by Nelson (2006) for high-frequency, high-exertion, and high-risk tasks; but the tasks were specific to L&D and were identified from the qualitative categories. Neither the survey instrument nor the Task Risk Assessment tools have been tested for psychometric properties. Although no other instruments for this purpose have been identified, it is unknown how other instruments measuring task risks in L&D might have affected the study's findings.

Conclusions

This study provides the first baseline information about the care tasks nurses perceive to be a risk for personal injury. We identified tasks that are risky because of the frequency of task performance by nurses, the exertion required, and the potential risk for injury. High-exertion tasks, tasks requiring awkward body postures by the nurse, and the culture of safety were the top categories that could cause nurses to sustain an injury. These high-risk care tasks should be discussed among staff in an attempt to enhance their awareness and to create a culture of safety to prevent work-related injuries.

All other hazardous occupations and work settings remind staff with signage and safety programs that warn them about potential workplace hazards that could lead to personal injury. Nursing has simply assumed that a good foundation in body mechanics taught initially in schools of nursing and reinforced upon job orientation is enough to prevent personal injury on the job, but this approach has clearly not been effective. Nursing needs to adopt safety initiatives implemented by other industries that have demonstrated successful track records in using technology and safety culture to minimize the numbers of employee injuries. Adopting the "Safety First" or "Safety is Priority One" slogans seen in other industries could bring the safety culture to the top of mind for nursing and other

health care providers. L&D presents some serious challenges for safe patient mobilization programs and individual nurses because of the emergent and emotionally tense time when caring for patients who may not always be fully coherent or cooperative during the last phases of the delivery experience. Further studies are recommended to actually access the effectiveness of programs in reducing employee injury and enhancing the culture of safety for nurses and other care providers in the L&D setting.

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