

Safe Patient Handling and Mobility Programs for Overweight and Obese Patients: A Cross-Sectional Survey

Menekse S. Barim, Marie A. Hayden, Edward Krieg Jr., and H. Amy Feng

National Institute for Occupational Safety and Health (NIOSH), Division of Field Studies and Engineering (DFSE), Cincinnati, OH, USA

ABSTRACT

Healthcare providers face numerous challenges in lifting and mobilizing overweight and obese patients, which often lead to musculoskeletal disorders (MSDs). To address this, hospitals implement safe patient handling and mobility (SPHM) programs, including mechanical lift equipment, policies, and training. This study surveyed 134 healthcare workers in five Veterans Administration Medical Centers who regularly used SPHM programs. According to findings, handling bariatric patients frequently correlated with higher chronic back pain risk. Injuries occurred when not using powered equipment. Improvements like sufficient time with equipment and clear policies reduced injury likelihood. Equipment was crucial in preventing musculoskeletal injuries and pain. Findings emphasize using powered equipment and updating SPHM programs based on worker feedback for better patient handling practices.

Keywords: Safe patient handling, Overexertion, Back pain, Musculoskeletal disorders

INTRODUCTION

Occupational back injuries in the healthcare sector have been a persistent concern, despite extensive efforts to reduce them (Andersen et al., 2019). Healthcare providers frequently face challenges related to overexertion and awkward postures, particularly during patient lifting. The cost of overexertion injuries in the U.S. healthcare industry was estimated to be \$1.7 billion in 2015 (Bell et al., 2017). Data from skilled nursing facilities between 2012–2018 revealed that patient handling injuries accounted for the highest portion (31.6%) of all claims (Pieretti et al., 2020). Occupational rates of overexertion injuries for registered nurses in hospitals are twice the average for all U.S. occupations (BLS, 2021) and twice the average for all occupational settings (BLS, 2008–2020).

Tasks frequently associated with patient handling injuries include repositioning a patient in bed, assisting during descent or falls, and transferring patients from a bed to a chair (Boynton, 2023). Relying solely on body mechanics for protection during patient lifting or movement is insufficient for healthcare providers (Saturdays, M. J., 2021). Conversely, the implementation of Safe Patient Handling and Mobility (SPHM) programs, which involve

the use of powered equipment to lift and transport patients, has shown significant reductions in physical strain, overexertion injuries, and work time lost (NIOSH, 2013; Satursky, M. J., 2021; Black et al., 2011; Collins et al., 2004; Evanoff et al., 2003; Garg and Kapellusch, 2012; Hwang et al., 2020; Wiggermann et al., 2020). Encouraging the use of adequate lifting equipment and eliminating risky manual lifting has become a crucial aspect of safe patient handling policies worldwide (American Nurses Association, 2012). Several states in the United States have also enacted safe patient handling legislation that mandates the provision of patient handling equipment to protect healthcare workers from musculoskeletal injuries (American Nurses Association, 2012). The U.S. Veterans Administration (VA) adopted such programs in all its Medical Centers, leading to substantial improvements (Rugs et al., 2013).

In addition to focusing on ergonomic factors, there is a growing acknowledgement of the importance of psychosocial factors in preventing occupational injuries among healthcare workers. A systematic review highlights the role of psychosocial factors, such as job demands, job control, effort-reward imbalance, and social support, as significant risk factors for musculoskeletal injuries (Bernal et al., 2015). Additionally, studies emphasize the role of good leadership in promoting the health status of healthcare workers (Akerjordet, et al., 2018). Another recent study aims to investigate both physical and psychosocial work environment risk factors for back injuries during patient transfer among healthcare workers in hospitals (Andersen et al., 2019). There are a number of studies related to safe patient handling and the goal of these studies is to understand the best practices of safe patient handling, injury prevention, and the use of appropriate equipment to reduce the risk of musculoskeletal injuries in healthcare professionals (Lee et al., 2015; Gilchrist, A. & Pokorna, A., 2021; Shieh et al., 2016). However, there is a gap in the literature that differentiate the usage and/or frequency of equipment based on the differentiation between bariatric and non-bariatric patients.

This study's main objectives are to determine the frequency of bariatric patient handling and the provision of bariatric equipment, and to assess their potential associations with workers' perceived musculoskeletal pain and/or injury. Recognizing that bariatric-related variables do not operate in isolation, they will be examined alongside non-bariatric SPHM and other factors, such as time to use equipment, safety climate, and worker demographics, to predict workers' self-reported musculoskeletal outcomes (Galinsky et al., 2021). By addressing both physical and psychosocial factors, this study aims to contribute to a comprehensive understanding of the factors influencing occupational back injuries among healthcare workers.

METHODOLOGY

Participants

The National Institute for Occupational Safety and Health (NIOSH) initiated an applied study conducted collaboratively with researchers at five Veterans Administration (VA) hospitals. Research teams at each VA hospitals selected units where employees interacted with patients regularly and could secure permission from management for participation in the study. They reached out

to 429 potential participants through emails and posted information in hallways and 134 (31%) volunteered to filled out the survey. From the responses 129 filled their age (42 ± 11). From 132 responses 80% responded female and 20% responded male (shown in Table 1). 131 responded working within areas for Medical Surgical 32%, Intensive Care 22%, Progressive Care/ Step Down 10%, Imaging 10%, “Other” 10%, Emergency Room 7%, Rehabilitation 5%, and Long-Term Care workers 4% (Galinsky et al., 2021). Before data collection, written consent was obtained from subjects by NIOSH’s IRB-approved study protocol (Galinsky et al., 2021).

Table 1. Demographic of respondents.

Demographics of respondents	n (%)	Mean \pm SD
Age	129	42 ± 11
Sex	132	
Female	106	
Male	26	
Body Mass Index		
BMI < 25	57 (43)	
25 < BMI < 29.9	38 (28)	
30 < BMI < 34.9	18 (13)	
35 < BMI < 39.9	14 (11)	
≥ 40	7 (5)	

Survey

NIOSH created a 43-item survey to measure workers’ perceived/recalled musculoskeletal outcome (overexertion injuries; back pain; upper extremity pain) and potential predictors (SPHM- and non-SPHM-related variables). Some pre-existing items from the NIOSH Quality of Work Life (QWL) Survey (General Social Survey, 2002–2014) were used along with new items developed specifically for this study. Patient handling was defined as “lifting or moving the patient or a part of the patient’s body during tasks like transferring, bathing, dressing, wound care, therapy, etc.” (Galinsky et al., 2021). Other new items used the terms “bariatric” and “non-bariatric,” to refer to patients weighing 300 or more pounds (> 136 kg) and less than 300 pounds, respectively. Stepwise multiple logistic and linear regression analyses of self-reported musculoskeletal outcomes were conducted in which each predictor was designated as an SPHM variable or a non-SPHM covariate. More details about the survey items are described by Galinsky et al. (2021).

Statistical Design

To identify the variables strongly associated with the outcomes and/or dependent variables, we utilized stepwise multiple regression with both logistic and linear regression. The analysis involved adjusting for the complete set of predictor variables and no variables were imposed into the models. Each predictor was considered equally likely to be associated with the outcomes. For each dependent variable, we sequentially entered and removed predictor

variables in the stepwise analysis. The entry and exit criterion used was a significance level of $p < 0.05$. This process continued until no additional predictor variables met the criteria for entry or removal. After completing the stepwise analysis, we conducted a logistic regression analysis to create a final model for each dependent variable, including only the predictors that remained statistically significant in their respective stepwise analyses. More details on the full predictor variables are described by Galinsky et al. (2021).

RESULTS

The survey examined the frequency of bariatric and non-bariatric patient-handling tasks performed by health professionals. For non-bariatric patients, the results indicated that 0.75% reported never or performing these tasks less than once a year, 0% reported more than once a year but less than once a month, 0.75% reported more than once a month but less than once a week, 7% reported more than once a week but less than once a day, 13% reported performing these tasks 1–3 times a day, and the majority, 79%, reported performing these tasks more than 3 times a day. The same question asked for bariatric patient handling and the results indicated that 3% reported never or performing these tasks less than once a year, 10% reported more than once a year but less than once a month, 24% reported more than once a month but less than once a week, 31% reported more than once a week but less than once a day, 21% reported performing these tasks 1–3 times a day, and 11% reported performing these tasks more than 3 times a day.

The survey also explored the availability of equipment for bariatric and non-bariatric patients. Among nurses with non-bariatric patients, 4% reported not having any access to equipment, 39% had some access but needed more, and 57% of health professionals had proper access to equipment. In the case of bariatric patients, the figures differed with 11% lacking access to equipment, 54% needing more, and 35% having appropriate access to equipment.

Table 2 displays the conclusive predictive models obtained from the logistic regression analyses. It presents the odds ratios (OR) along with 95% confidence intervals (CI) for the significant predictors associated with each outcome variable. The outcome for workers to experience back pain every day for more than one week was significantly associated with the hours worked per week (OR = 1.09, 95% CI: 1.01–1.17), and prior back pain or injury (OR = 4.18, 95% CI: 1.69–10.32). More often, when the SPHM policy was easy to follow (which means SPHM policies are clear and well-suited for workflow) (OR = 0.41, 95% CI: 0.21–0.80) the odds were reduced of workers experiencing any back pain in the past four weeks. Along with ease of following SPHM policies and procedures, in the last year, workers recalled experiencing fewer patient handling injuries when they had more time to use the equipment (OR = 0.24, 95% CI: 0.10–0.58). Significant Non-SPHM covariates for the outcome with any back pain in the past 4 weeks were female sex (OR = 4.46, 95% CI: 1.42–13.99), and prior back pain or injury (OR = 11.42, 95% CI: 3.62–36.03).

Table 2. Predictive models for each outcome.

Outcome	N	Predictor	OR	95% CI
Overexertion injury while patient handling in the past year	133	How often enough time to use the equipment	0.24	0.10–0.58
Back pain every day for ≥ 1 week	114	Bariatric patient handling frequency	2.01	1.32–3.06
		Hours worked per week	1.09	1.01–1.17
		Prior back pain or injury	4.18	1.69–10.32
Any back pain in the past 4 weeks	130	How often it's easy to follow SPHM policies	0.41	0.21–0.80
		Sex Female vs Male	4.46	1.42–13.99
		Prior back pain	11.42	3.62–36.03

DISCUSSION/CONCLUSION

Healthcare workers often encounter back-related issues during patient lifting/transfers. These problems are often caused by sudden and unexpected injuries that occur during patient handling. Multiple studies have demonstrated a connection between patient handling and the risk of back injuries, and biomechanical studies have confirmed the significant physical strain on the back during such tasks (Andersen et al., 2014). According to a prospective study by Andersen et al. (2019), their findings indicated that a greater number of patient transfers and inadequate collaboration and support from colleagues were identified as risk factors for back injuries. Findings showed that in situations where back injuries occurred, the healthcare workers frequently faced a shortage of necessary assistive devices, including sliding sheets, intelligent beds, walking beds, walking aids, and ceiling lifts, which were most reported as lacking.

Biomechanical laboratory studies have demonstrated that the use of a ceiling lift during patient transfer results in lower muscular load compared to traditional floor lifts (Keir & MacDonell, 2004). However, another study found similar reductions in compression forces on the low back when using both ceiling, floor lifts and sliding sheets (Holmes et al., 2010). Two longitudinal intervention studies have found limited evidence supporting preventive interventions with assistive devices in reducing musculoskeletal pain and injuries among healthcare workers (Skotte & Fallentin, 2008).

As mentioned above, previous studies have encompassed a variety of topics, including workplace interventions aimed at enhancing SPHM (Wählin et al., 2022), strategies to reduce musculoskeletal injuries (Sousa et al., 2023), utilization of obesity data to mitigate risks (McClellan et al., 2021) and the correlation between nurses' workload and patient obesity (Huang et al., 2021). However, no previous research has specifically measured the frequency of bariatric and non-bariatric patient handling from the standpoint of the workers involved.

Back pain is commonly managed using diverse health and safety measures, approaches and interventions in hospitals that have implemented safe patient handling programs during the past decade (Skela-Savic et al., 2017). And for this study, VA hospitals were selected because of their SPHM programs and practices. These findings will help health professionals who are seeking to implement or improve their SPHM programs. According to a literature review (Mayeda-Letourneau PT, J, 2013), a SPHM program may result in fewer workplace accidents involving healthcare workers, greater job satisfaction, and lower overall work injury costs for employers, all of which may have long-term effects on registered nurse recruitment, retention, and satisfaction. When workers felt their workplace SPHM policies and procedures were easier to follow, rather than difficult, workers were less likely to have acute back pain. Other studies found similar results in reduced patient handling injuries by having bariatric handling policies and procedures and mandating the use of equipment (McClean et al., 2021; Lee et al., 2021). It is noteworthy that 63% of the participants with bariatric patients on a weekly basis or more, and among them, 11% remembered encountering such cases more than three times each day. In contrast, non-bariatric patients were attended to by 92% of the respondents at least once daily, with 79% of the recalling instances of over three times daily care.

Back pain was found to be related to the frequency of handling bariatric patients in the SPHM predictors' results. On the other hand, with each increase in perceived bariatric equipment sufficiency, the likelihood of chronic upper-extremity pain decreased by 60%. To our knowledge, this was the first to quantitatively identify frequency as a work hazard when handling bariatric patients and that bariatric equipment sufficiency has a significant effect on the safety program (Galinsky et al., 2021). Other studies confirm and broaden the significance of access to equipment such as ceiling lifts and SPHM practices were associated with fewer reports of musculoskeletal symptoms (Lee et al., 2015; Lee and Lee, 2017; Lee et al., 2021).

This study offers new data on variables that can be assessed and updated to enhance SPHM for health professionals who regularly handle both bariatric and non-bariatric patients. It can be useful to identify changes that need to be made by periodically asking workers for feedback on using and following SPHM policies. The findings demonstrate advancements in practical SPHM research and emphasize the value of equipment used in lowering the possibility of pain and injury. All the injuries mentioned by respondents occurred when no powered equipment was in use.

ACKNOWLEDGMENT

The authors would like to thank Traci Galinsky, Lena Deter, Catherine Battaglia, Revonda Bell, Kathlyn Sue Haddock, Tony Hilton, Charlotte Lynch, Mary Matz, Sarah Moscatel, Franciner D. Riley, Debi Sampsel, Sandra Shaw for their contribution to this study during participant recruitment and survey data collection.

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

DISCLAIMER

The findings and conclusions in this chapter are those of the authors and do not necessarily represent the official position of the National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention.

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