Creating a Culture of Safety Where Size Does Not Impact Care:

Evidence-Based Safe Mobility in the Intensive Care Unit

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Introduction

Early and progressive mobility programs have become increasingly recognized as important for minimizing patient deconditioning associated with bed rest, sedation, and immobility that is common in intensive care units (ICUs) (Hunter, Johnson, & Coustasse, 2020; Zang, K. et al., 2020). Complications associated with admission to the ICU are well known and include pneumonia, other pulmonary complications, skin breakdown, and infections. (Cardosa et al., 2022). Many of these complications result from the physiological changes that occur during prolonged bed rest, such as muscle atrophy, decreased cardiac output, and decreased pulmonary function. This is true for all patients, but perhaps more significant for patients with obesity (Anderson & Shashaty, 2021).

In a recent study (Bradford, 2024), 60% of patients over age 65 in the 32-bed CVICU had a body mass index (BMI) greater than 30. Caring for bariatric patients in the ICU presents unique challenges for healthcare professionals. Among the many challenges, one of the most prominent is ensuring the mobility and safe handling of patients with obesity. Creating a culture of safety in the context of bariatric patients in the ICU is crucial for minimizing complications associated with immobility. Early and progressive mobility programs are recognized as essential for reducing patient deconditioning resulting from bed rest and sedation, which are common in ICUs. Complications such as pneumonia, skin breakdown, and infections are prevalent, particularly among patients with obesity, who face unique challenges due to their weight and associated comorbidities.

Importance of Early and Progressive Mobility

Implementing early and progressive mobility is a logical preventive measure to combat immobility and its associated risks. Research indicates that early mobility is feasible and beneficial for critically ill patients, especially those on mechanical ventilation. Benefits include improved functional status, reduced length of hospital stays, and fewer ventilator days. For instance, after early mobilization interventions, patients in a trauma and burn ICU were significantly less likely to develop pneumonia or other pulmonary complications. Additionally, early mobilization is linked to long-term outcomes, such as decreased hospital readmission rates (Arnold et al., 2022; Klompas et al., 2022).

Despite the clear benefits of early mobility, healthcare workers face considerable occupational risks, including a high rate of injury during patient handling tasks. On average, U.S. hospitals recorded nearly three times (7.6) the work-related injuries and illnesses for every 100 full-time employees in 2020, compared with 2.7 per 100 full-time employees for all U.S. industries combined (OSHA, 2025).

Patient handling and mobilization are significant contributors to these injuries. The lifting demands often exceed safe limits, and many injuries result from overexertion during mobility assistance.

To address these challenges, it is essential to develop evidence-based mobility protocols that prioritize both patient and staff safety. Successful implementation involves interdisciplinary team engagement and the use of tools to track patient tolerance and manage mobility interventions effectively. A balanced approach that considers the needs of both patients and healthcare workers can lead to improved safety outcomes.

Bariatric patients, often defined as those whose weight interferes with the ability for healthcare professionals to provide equitable care, have distinctive needs due to their weight and/or weight distribution. Patients with obesity may have limited mobility, respiratory issues, and comorbid conditions, making mobility in the ICU particularly challenging.

Because immobility is an important factor in the development of hospital-acquired conditions, implementing early and progressive mobility is a logical preventive measure (Wyatt et al., 2020). However, early and progressive mobility efforts without appropriate consideration of occupational safety can pose a threat to the frontline healthcare staff irrespective of the patient's size. The rate of occupational injury associated with critical patient care is high and exceeds average rates of injury among the general population (Zang,

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2023). In this paper, the patient benefits of an early and progressive mobility program are described with special attention given to patients with obesity; the occupational risks of manual handling are outlined; and a case study is presented that offers a practical and novel solution to the risks associated with early mobility tasks performed with manual handling practices, which incorporates the use of mobility coaches and the tracking of mobility data.

Early and Progressive Mobility in the ICU

Current literature demonstrates that early, progressive mobility is both feasible and beneficial for all-sized critically ill patients, particularly those receiving mechanical ventilation (Hunter et al., 2020). Data support that reported benefits include improved functional status, decreased length of stay in the hospital and the ICU, as well as fewer ventilator days. Decreased length of stay in the ICU and/or hospital is the most frequently significant outcome of mobility interventions reported in the literature (Arnold et al., 2022). Pulmonary benefits of mobility interventions are also evident in the literature.

For at least the past two decades, early mobilization has yielded meaningful outcomes. For example, after implementation of an early mobilization intervention in a trauma and burn ICU, patients were less likely to develop pneumonia ($p \leq .01$) or other pulmonary complications ($p \leq .001$) (Clark, et al., 2013). When physical therapy was ordered within 24 hours of admission for mechanically ventilated patients with respiratory failure, these patients had fewer ventilator days ($p = .007$) than those with physical therapy ordered at the discretion of the provider (Ronnebaum et al., 2012). In a multicenter randomized control trial, mechanically ventilated, sedated patients receiving early mobilization, coupled with interruption to sedation, were more likely to return to independent functional status ($p = 0.02$), demonstrated less delirium ($p = .03$) and had fewer ventilator days ($p = 0.02$)

(Schweickert et al., 2008; Schweickert & Kress, 2011: Clark et al., 2013: Ronnebaum, 2012). Finally, in a neurologic ICU, the implementation of an early, progressive mobility protocol resulted in fewer episodes of ventilator associated pneumonia (VAP) ($p < 0.001$) (Titsworth et al., 2012). There is also evidence that early mobilization in the ICU may be associated with improved long-term outcomes, such as decreased hospital readmission rates (Hunter et al., 2020).

Occupational Hazards and Early Mobility

Most healthcare facilities across the United States have early and progressive mobility protocols and policies in place; however, from a practical perspective, hesitation exists to embrace these practices due to the realistic fear of worker injury. While the data in support of early mobility for improving patient outcomes are strong, it is also important to consider frontline staff safety. Currently, the Healthcare and Social Assistance (HCSA) sector employs 6% of the total U.S. work force (Council NHaSAS, 2021). Research suggests that hospital workers have a higher rate of injury than workers in other occupational settings. According to 2019 Bureau of Labor Statistics data, incidence rates of work-related illness and injury for healthcare workers are more than double the average rate for all U.S. industries, at 8.6 versus 3.1 recordable cases per 100 full-time workers per year, respectively (Bureau of Labor Statistics, 2019). Using the North American Industry Classification System (NAICS) codes, these figures include healthcare workers in nursing and residential care facilities (623), general hospitals (622), and psychiatric hospitals (6222). Among hospital workers, nurses in particular have a high rate of injury (Strid et al., 2021). Among the numerous occupational factors presenting injury risks for healthcare workers, patient handling and mobilization activities were of particular concern. As far back as 2009, Randall and others reported patients with BMI >35 represented 10% of the population yet were associated with nearly 30% of patient handling injuries (Randall et al., 2009).

Lifting demands for patient care workers, regardless of patient size and weight, frequently exceed safe lifting limits recommended for patient handling activities as defined by the National Institute for Occupational Safety and Health (NIOSH) Lifting Equation. Unfortunately for healthcare professionals, their daily job duties require excessive walking, bending, stretching, standing, and positioning to provide patient care. These spontaneous and varied tasks often do not conform to what is known about proper body mechanics or comply with safe lifting loads. Approximately half of job-related injuries for nurses are the result of overexertion, and assisting patients with early mobility was identified as a major contributing factor in these cases. According to a meta-analysis done by Teeple and others (2018), the greatest opportunity for reducing occupational injury rates was observed for ICU-only interventions. Among the care levels studied, the authors reported that ICU patients generally required the greatest amount of mobility assistance, including frequent repositioning and transfers for patients who may be unconscious, sedated, on ventilator support, and who may be unable to cooperate with mobility assistance or have other substantial activity limitations.

Dockrell and Hurley (2021) explained that most clinical nurse managers (93.1%) provided care for bariatric patients and 85.6% reported barriers to the provision of bariatric care within their clinical area. The principal barriers were lack of equipment (75%), staff (65.2%), and training (57.6%). Only 11.4% owned all the required equipment. Owning equipment provided significantly greater access to a hoist ($P = 0.001$) and chair ($P = 0.032$) than renting. Only 9.5% reported that rented equipment always arrives on time. The majority (74.4%) did not have guidelines for caring for bariatric patients, and 46.2% considered this to be a barrier. This serves as one of many barriers to mobility in the ICU (Babazadeh, 2021).

In the ICU setting, therefore, it is not surprising that the systematic reduction of occupational hazards through safe mobility practices was an effective strategy in reducing worker injuries. A systematic approach is necessary to limit risk associated with both common, repetitive mobility tasks as well as challenging, spontaneous tasks (Pryor et al., 2020).

Integrating Worker Safety into the Mobility Protocol

The feasibility of implementing a mobility protocol is well demonstrated in the literature; however, mobilizing critically ill patients is not without risk. Key elements for implementing a successful program include the development and implementation of a rigorous and evidence-based protocol that addresses occupational safety, as well as interdisciplinary team engagement (Gallagher, 2021).

Several examples of protocols have been developed using a combination of evidence and expert review (Wyatt et al., 2020; Escalon, 2020). For instance, a mobility protocol is often implemented as part of a larger comprehensive bundle that addresses multiple issues related to sedation and mechanical ventilation. Important adjuncts to mobility protocols include tools to quantify and track patient tolerance to early and progressive mobility, measure patient exertion, and manage sedation interruptions. Each of these tools address patient tolerance; however, Wyatt et al., (2020) describe specific safe mobility practices such as mobility equipment and training, which were integrated into the mobility protocol described above. Integrating worker safety into the protocol is key to addressing occupational health and safety.

A New Paradigm for Worker Safety

To create the most effective safe and occupationally sound mobility program, it is imperative to rethink the common

paradigm of separate cultures of safety for patients and for healthcare workers. The resulting framework is a culture of safety that simultaneously considers and includes both patients and healthcare workers (Pritts, 2022). When patient and healthcare worker program development occur separately, solutions can be inadvertently launched that optimize the safety of one group at the expense of the other. A balanced program can address the needs of both patients and healthcare workers. Program management often relies largely on lagging indicators such as employee injury frequency, severity, and cost. While lagging indicators are an important part of overall program management, they represent past performance, so they are not fully used for real-time program management. Conversely, leading indicators such as staff training, appropriate use of mobility equipment, and evidence-based coaching during actual patient handling tasks represent opportunities for real-time program management that have the potential to proactively improve the safety of both patients and staff members (Gabele et al., 2021). Gabele et al., (2020) published findings featuring a balanced program with a two-phase project that examined the relationship between leading and lagging indicators. This comparative project used worker injury data over time to determine whether a model that was successful in a large urban medical center could be equally as successful in a small, suburban medical center. In the larger medical center setting, from July 2015 to June 2016, there were 85 preventable worker injuries associated with patient handling. From July 2016 to June 2017, there were only 52 preventable injuries. From July to December 2017, preventable patient handling injuries dropped further to 12. The same handling and mobility program was put into place at the 101-bed suburban medical center. Retrospective occupational injury data were collected and served as the baseline data set. Study data were collected at the smaller facility from January 2020 to October 2020. Baseline data and study data were compared. At the smaller site, there were a total of seven (7) patient-handling related injuries in the 2019 calendar year. Post-intervention (January to November 2020), there were only two (2) injuries related to unsafe patient handling practices.

Case Study

In 2012, NorthBay Healthcare implemented a balanced 12-month program which integrated the use of the Atlas Lift Tech Mobility Coach Integrated Program (San Ramon, CA) and electronic data collection (Atlas Mobility Cloud Software, San Ramon, CA) of patient handling tasks, using both lagging and leading indicators to measure program outcomes. This model was different from other approaches which used Lift Teams or minimal lift models because it also addressed barriers to adopting safe handling practices by providing strategic resources. The key to the success of this model is the use of trained mobility coaches who were experts in safe mobility, body mechanics, and equipment. Mobility coaches provided standardized staff training in Five Area Body Exposure and appropriate use of technology-assisted mobility, supported by ongoing real-time coaching and assistance with mobility tasks during patient care activities. Mobility coaches were available for consultation, mobility training, or to assist with patient mobility as needed. This was accomplished using prescheduled appointment times or on an emergent basis through continuous rounding on clinical units. Mobility coaches were hospital experts on mobility policies and procedures, initial and ongoing training needs, and on all mobility equipment and devices. The goal of the mobility coach model was to reduce staff injury, improve compliance with early and progressive mobility goals, improve the use of, and compliance with, the recommended mobility devices and equipment, and reduce the risk of negative patient outcomes associated with immobility.

Over the 12-month project period (6 months pre/post programmatic implementation), the leading indicator of staff training was initially established through a skills fair, and ongoing training was provided as needed on a continual basis by the mobility coach as new staff members were hired. This allowed the facility to consistently maintain 100% staff training. Data on the leading outcome indicator of appropriate use of mobility devices and equipment were collected by the mobility coaches, with mean compliance at approximately 85% over the six-month post-implementation period.

For the lagging indicator of employee injury, based on insurance injury data, there was a reduction in both severity and frequency of patient handling injuries, resulting in an overall cost decrease from $395,240.97 (2011: pre-implementation) to $29,596.94 (2012: post-implementation). In 2020, using the same insurance injury data, the overall cost for patient handling injuries continued at a low rate. This initial and ongoing reduction in loss history demonstrated the causal correlation between leading and lagging indicators, pointing to the value of the proactive approach in terms of hard quantitative data. Based on the success of initial program implementation, a decision was made to continue the program. Since about half of nursing job-related injuries are due to overexertion, much of which is related to patient mobility, convenience sampling was used to collect data on types and frequency of patient mobility tasks for 12 months (January 2019-December 2019) at four additional hospitals in the system. These mobility task data are a fundamentally important part of any successful mobility program, and they provide hospitals with the information needed to best address the unique needs that vary from hospital to hospital. In this example, data on a total of 58,196 mobility tasks were collected during this period (2019). Most tasks were completed in the ICUs (65%), and in-bed mobility represented 89.5% (N = 52,079) of the total mobility tasks. Through the implementation of this balanced mobility program, the hospital achieved a high level of compliance with the leading indi-

cators of both staff training coverage and appropriate use of mobility equipment. Program success was further supported by the substantial reduction in the lagging indicator of employee injury cost over time. Staff satisfaction with the program was also high.

Conclusion

Early and progressive mobility in the ICU has been successfully implemented in numerous published studies and quality improvement projects and has demonstrated important benefits to patients. (See Table 1 - Numbers and percentage of coach-supported in-bed mobility tasks: leading indicators care.) While the case example used a specific, commercially available model for mobility (Atlas Lift Tech), our broader goal was to describe the components needed for a balanced approach which addresses the needs of all-size patients and staff. These include a robust implementation strategy which incorporates an evidence-based protocol with interdisciplinary team engagement, a standardized mobility program that incorporates attention to occupational safety, data tracking to increase understanding of mobility needs in different clinical areas, investment in appropriate safe patient handling equipment, and the use of trained mobility personnel. These components are fundamentally important to help minimize risk, maximize benefit, and create an impactful, cost-effective, and sustainable mobility program that improves safety for both patients and frontline healthcare staff.

The need for guidelines, technology training, consistent terminology, and evidence

Ewen (2022) and others highlighted care opportunities for patients with class III obesity in acute care settings: these included mobilization, wound management, maintaining dignity, comfort, and safety. They emphasized the need for specific guidelines to address these aspects of care and reduce weight stigma. The literature revealed a lack of proactive planning for properly sized equipment and technology, and a lack of sufficiently trained staff confident in providing care, both crucial for preventing injury and maintaining patient dignity.

Additionally, inconsistent terminology for defining this patient group can lead to inaccurate guideline application. Therefore, standardizing obesity classification terminology is recommended to ensure uniform procedures and guidelines, ultimately enhancing safety and patient care.

Robust evidence is urgently needed to inform the unique nursing care needs of patients with class III obesity.

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