Creating a Culture of Worker Safety: Evidence-Based Safe Mobility in the ICU

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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). (Adler & Malone, 2012; Atkins & Kautz, 2014; Bassett, Vollman, Brandwene, & Murray, 2012; Engel, Needham, Morris, & Gropper, 2013; Hunter, Johnson, & Coustasse, 2020; Rose et al., 2015). Complications associated with an admission to the ICU are well known and include pneumonia, other pulmonary complications, skin breakdown, and infections. Many of these complications result from the physiologic changes that occur during prolonged bed rest, such as muscle atrophy, decreased cardiac output, and decreased pulmonary function. Because immobility is an important factor in the development of hospital-acquired conditions, implementing early and progressive mobility is a logical preventative 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. The rate of occupational injury associated with critical patient care is high and exceeds average rates of injury among the general population. (Adamczyk, 2018)

In this paper, the patient benefits of an early and progressive mobility program are described, 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 critically ill patients, particularly those receiving mechanical ventilation. (Hunter et al., 2020; Investigators, 2015; W. D. Schweickert & Kress, 2011) 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. (Adler & Malone, 2012; Cameron et al., 2015) Decreased length of stay in the ICU and/or hospital is the most frequently significant outcome of mobility interventions reported in the literature. (Ronnebaum, Weir, & Hilsabeck, 2012; Winkelman et al., 2012)

Pulmonary benefits of mobility interventions are also evident in the literature. 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, Lowman, Griffin, Matthews, & Reiff, 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 ($p = 0.02$). (W. Schweickert et al., 2008; W. D. Schweickert & Kress, 2011) 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. (Adler & Malone, 2012; Engel et al., 2013; Hunter et al., 2020; Investigators, 2015)

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. (Dressner, 2017) 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 Sta-

tistics, 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. (Dressner & Kissinger, 2018) Among the numerous occupational factors presenting injury risks for healthcare workers, patient handling and mobilization activities were of particular concern. Lifting demands for patient care workers 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 nurses, 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. 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. (Atkins & Kautz, 2014; Bassett et al., 2012) (Campbell, Fisher, Anderson, & Kreppel, 2015; King, 2012; Zomorodi, Topley, & McAnaw, 2012) Several examples of protocols have been developed using a combination of evidence and expert review. (Wyatt, et al., 2020; Balas et al., 2012; Balas et al., 2014; Titsworth et al., 2012; Zomorodi et al., 2012) 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. (Balas et al., 2012; Cameron et al., 2015; Zomorodi et al., 2012) 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. (Black, Salsbury, & Vollman, 2018) When patient and healthcare worker program development occur separately, solutions can be inadvertently launched that optimize the safety of one group at the expense 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. (Manuele, 2009) While lagging indicators are an important part of overall program management, they represent past performance, so they are not useful 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. (Manuele, 2009; 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 have been 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 through the use of 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 6-months 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). The majority of 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 indicators 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 patient

Table 1. Numbers and percent of coach-supported in-bed mobility tasks: leading indicators

Task Description	Number (%)
Reposition	22,743 (43.67%)
Boost	19,772 (37.96%)
Linen change	7,700 (14.79%)
Skin check/Wound Care	1,864 (3.58%)

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 both 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.

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