A Mobility Program for an Inpatient Acute Care Medical Unit

A quality improvement project to mitigate the adverse effects of bed rest shows promise.

OVERVIEW: For many patients, hospitalization brings prolonged periods of bed rest, which are associated with such adverse health outcomes as increased length of stay, increased risk of falls, functional decline, and extended-care facility placement. Most studies of progressive or early mobility protocols designed to minimize these adverse effects have been geared toward specific patient populations and conducted by multidisciplinary teams in either ICUs or surgical units. Very few mobility programs have been developed for and implemented on acute care medical units. This evidence-based quality improvement project describes how a mobility program, devised for and put to use on a general medical unit in a large Midwestern academic health care system, improved patient outcomes.

Keywords: ambulation, evidence-based practice, mobility, mobility program, quality improvement

Bed rest is well known to have numerous adverse effects on the human body (see Table 1).[1,2] Functional decline, defined as loss of the ability to perform self-care or activities of daily living, may result not only from illness or adverse treatment effects, but also from deconditioning associated with inactivity, the negative effects of which can be seen after relatively short periods. For a variety of reasons, however, hospitalized patients spend most of their time in bed, even when they are able to walk. For example, a study of 45 elderly patients on a general medical unit, who had neither delirium nor dementia and were able to walk prior to admission, found that they spent an average of 20 out of every 24 hours in bed over the mean 5.1 days they were hospitalized.[3] Similarly, researchers who studied 78 adults admitted to a respiratory unit for diagnostic or preoperative evaluation, who were able to walk and not confined to bed rest, found that over a five-day period their functional capacity had decreased in all six areas assessed: upper limb muscle strength, respiratory muscle strength, lung function, chest wall expansion, submaximal exercise tolerance, and spinal and trunk mobility, the latter of which was associated with a 30% rise in reports of back pain.[4] Longer periods of hospitalization inevitably lead to more severe deconditioning.

Patients, nurses, and physicians have identified the following barriers to patient mobility[5]:

- medical devices, such as drains, chest tubes, and IV lines
- insufficient staff to provide assistance
- staff fears about patients falling
- lack of ambulatory devices, such as walkers and gait belts

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- symptoms, such as weakness, pain, or fatigue
- lack of patient motivation

Most literature related to mobility programs or protocols focuses on patients in ICUs. In such settings, multidisciplinary early mobility programs have reduced ventilation days, rates of hospital-acquired infection, and lengths of both ICU and hospital stays.[6-9] Despite the positive outcomes associated with early mobility in the ICU, when patients are transferred from the ICU to a general medical unit, they are typically limited to bed rest or sitting up in a chair until they are evaluated by a physical therapist, which may take anywhere from 24 to 48 hours.

The few mobility studies that have been conducted outside of an ICU have been limited in scope, focusing on the impact of mobility in specific patient populations, such as postsurgical patients and those with deep vein thrombosis, community-acquired pneumonia, or functional decline.[10-12] Within these populations, however, evidence clearly favors early mobility. A review of studies that compared the effects of early mobilization and compression versus bed rest on patients with acute deep vein thrombosis suggested that mobilization and compression significantly reduced the incidence, severity, and recurrence of postthrombotic syndrome while posing no greater risk of thrombus.[10] Patients with community-acquired pneumonia who participated in an early mobility program, which included moving out of bed into an upright position (to be sustained for at least 20 minutes) within 24 hours of admission and increasing movement each day, had a shorter length of stay than those receiving the usual hospital treatment.[13] When an interdisciplinary quality support team developed mobility guidelines that included a common language for describing the level of mobility assistance patients required, the acute medical–surgical unit where it was applied saw a 14% increase in unrestricted patient activity orders, a 70% overall adherence rate for staff use of the common language, a 3% reduction in urinary tract infections, a 1.7% drop in pneumonia incidence, and a 4.3% decrease in other pulmonary complications.[2]

There is little literature on use of mobility protocols on acute care medical units like ours, a 32-bed general medical unit in a Midwestern hospital that primarily treats adults with medical conditions such as sepsis, hypertension, acute and end-stage renal disease, end-stage liver disease, diabetes, diabetic ketoacidosis, and dementia, and cares for relatively few surgical patients. Findings common to the various mobility studies, however, include the need for collaboration among disciplines and sustainable, standardized mobility guidelines. These findings, in combination with the limited activity noted among patients on our general medical unit, prompted us (an interdisciplinary team) to consider intervening through the initiation of a quality improvement project. The purpose of this project was to determine whether an early mobility program would improve patient outcomes on our unit. We would determine the efficacy of the program by comparing patient lengths of stay, hospital readmission rates, and the incidence of unit falls and pressure ulcers both before and after program implementation.

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THE PROJECT'S FRAMEWORK

According to the institutional review board, this quality improvement project did not require human subjects approval.

Table 1. Negative Effects of Bed Rest[1, 2]

Complications	Potential Patient Outcomes
Depression/apathy Orthostatic hypotension Atelectasis Pneumonia Constipation Pressure ulcer formation Thromboembolic disease Muscle atrophy and weakness Joint contractures	Increased likelihood of discharge to skilled nursing facility/rehab Increased length of stay Increased risk of falls Increased morbidity

The framework for this project was the Iowa Model of Evidence-Based Practice to Promote Quality Care, which incorporates research utilization and emphasizes the application of current best evidence to guide the delivery of health care services.[14] The clinical nurse specialist (CNS) on the unit (one of us, WW) critiqued and synthesized the literature, which she then shared with the others on the interdisciplinary project team. Together, we decided that it would be appropriate to develop and pilot an early mobility program on our unit.

The mobility aide's primary role was to assist patients in performing specific activities determined by their ability to walk independently.

Planning the intervention. In addition to the CNS, the unit's interdisciplinary project team included the nurse manager (JG), clinical nurse supervisor (SK), physical therapist (AT), and director of patient care services (SD-M), as well as a physician (RC), nursing assistant (DA), and school of nursing representative (DT). Team members possessed both clinical expertise and knowledge of quality improvement methodologies. The school of nursing representative assisted in design, data collection, and data interpretation. Led by the CNS, the team met on several occasions to review current literature, develop inclusion and exclusion criteria, and create the program's protocol and interventions. Exclusion criteria, developed to ensure patient and staff safety, were as follows:

- significant language barrier requiring a translator
- orders in place for hospice or comfort care
- extreme agitation or need for restraint
- orders in place for bed rest or restricted activity
- hemodynamic instability, as determined by the nurse or medical team
- refusal to participate by the patient or family

With these exceptions, all patients admitted to the unit between April and June of 2012 were eligible to participate and were expected to benefit from the program.

Depending on whether they could walk independently, patients who participated in the program were assigned to one of two activity tiers and encouraged to perform activities in their assigned tier at least three times daily with assistance or oversight (see Table 2 for more details on the program). While the specific activities each patient performed daily were based on the physical therapist's recommendations, the protocol tiers were developed by the multidisciplinary team and derived from mobility literature.[2, 6]

The 'mobility aide' role. The unit nurse manager assigned the team's nursing assistant to function as a mobility aide during her scheduled shifts. Under the direction of the nursing staff and the unit physical therapist, the mobility aide assisted patients with appropriate interventions three times a day and performed regular nursing assistant duties the rest of the time. The project team set a kickoff date of April 2, 2012, and provided patients and family members with handouts a day in advance that described the mobility protocol and the importance of being active. Although the mobility aide carried out the majority of the interventions, nurses and family members were asked to encourage patients to participate in the program and to assist them when the aide was unavailable.

Before program initiation, the physical therapist taught the mobility aide about body mechanics, active and passive range of motion, use of a gait belt, and how to perform basic transfers (helping patients move from bed to chair, for example). She also taught the aide terms commonly used by physical therapists to describe assistance requirements (such as "minimum assistance" to refer to a one-hand assist) and reviewed these terms with the nursing staff. The physical therapist also met with the unit nurses to describe the mobility protocol and address any questions or concerns.

Table 2. Early Mobility Program for Medical–Surgical Patients

Tier Level	Defining Characteristics	Intervention[a]
Tier 1: Nonambulatory	Patients who • require more than a one-person assist for ambulation/transfers • are unable to maintain weight on their lower extremities • require any form of lift equipment	Active range-of-motion exercises: • ankle pumps • heel slides • hip abduction • quad sets • shoulder flexion Passive range-of-motion exercises: • ankle dorsiflexion • hip flexion • hip abduction • shoulder flexion Sit on side of bed Get out of bed and into a chair with appropriate equipment
Tier 2: Ambulatory	Patients who • are able to ambulate independently • require a one-person assist with ambulation	Ambulate with or without assistance in the hallway as tolerated Get out of bed and into a chair for all meals

[a] To be performed three times a day (in accordance with a patient's ability).

The program protocol outlined the role and responsibilities of the mobility aide.

- At the start of the shift, review activity orders for all patients on the unit.
- Discuss each patient's activity tier level and ability to participate with the patient's nurse.
- Work with all participating patients to assist with or supervise three activity sessions per day.
- Meet with the physical therapist to discuss each patient's progress, any necessary tier modification, and the potential need for formal physical therapy evaluation.

When such a formal evaluation was needed, the physical therapist would notify the patient's nurse, who in turn would notify the physician. After a patient received a formal evaluation, the physical therapist communicated with the nurses and mobility aide by hanging a mobility instruction sheet in the patient's room to specify any mobility precautions and the required level of assistance. Although the hospital provides a standard form for use by all physical and occupational therapists, this form was modified for the purpose of the mobility program to indicate the patient's tier level. The mobility aide would then assist or supervise the patient in performing activities prescribed on the modified instruction sheet. The physical therapist evaluated and treated only patients who had a physician's order for skilled therapy.

EVALUATING THE INTERVENTION

Both process and outcome measures were collected for the purpose of program evaluation. The primary process metric was the frequency of patient completion of activity sessions. Each patient received an overall early mobility achievement score, which was calculated by dividing the number of activity sessions in which a patient participated by the number of sessions in which she or he should have participated. A patient hospitalized for four days, for example, should have participated in at least three activity sessions per day, or a total of 12 sessions for the entire stay. If the patient participated in nine of the 12, her or his mobility achievement score would be 75%.

Patient outcomes that were evaluated to determine the impact of the intervention included the

- unit's number of falls per month.
- incidence of unit-acquired pressure ulcers.
- rate of readmission to the hospital within 30 days of unit discharge.

- average unit length of stay.
- hospital's case mix index (CMI), a severity of illness measure assigned to a patient population, which could be considered a potential confounding variable.

Analysis. Outcomes data were collected on a monthly basis through institutional administrative databases. With the exception of the mobility measures, all data were collected on a regular basis prior to program initiation and so collection required no additional effort. To determine the impact of the intervention on patient outcomes, data from three months prior to implementation were compared with data at three and seven months after implementation. Mean scores and standard deviations for each preintervention and postintervention outcome were calculated. Because this was a quality improvement project focused on a small sample, significance values were not determined.

OUTCOMES

All patients admitted to the unit during the study period, April through June of 2012, were evaluated for inclusion. A total of 521 (96%) of patients admitted during that period participated in the project.

Of those who participated, 434 (83.3%) patients were assigned to tier 2 (ambulatory) and 60 (11.5%) were assigned to tier 1 (nonambulatory). The remaining 27 (5.2%) participated in both tiers at least once during their hospital stay. On average, patients completed 1.74 (SD, 0.34) activity sessions daily, giving the entire unit a daily overall early mobility achievement score of 58%. Although we fell short of our goal of patients' completing three activity sessions daily, a vast majority (87.7%) of patients completed at least two sessions per day on the unit. No untoward events, such as falls or inadvertent removal of tubes, lines, or drains, occurred during the activity sessions, suggesting that the mobility protocol was safe for patients and staff.

The frequency of key activities was reviewed for patients in each tier. Of the patients assigned to tier 2, a total of 375 (86.4%) walked at least once during their stay, with the number of walks per patient per unit stay ranging from one to 23. Patients assigned to tier 1 and those who took part at some point in both project tiers participated in the following activities at least once during their stay:

- getting out of bed and into a chair (n = 42 [48.3%]; range, one to 13 times per patient per unit stay)
- walking (n = 49 [56.3%]; range, one to nine times per patient per unit stay)
- performing range of motion exercises (n = 20 [22.9%]; range, one to 11 times per patient per unit stay)

Initially, data collected during the three months prior to program implementation were compared with data collected three months following implementation (see Table 3). Before program initiation, the unit's mean number of falls was 4.33 (SD, 3.21) per month, which decreased to 3.33 (SD, 1.15) per month three months following program initiation. Similarly, mean monthly readmission rates were reduced from 19.7% (SD, 2.71) before the intervention to 17.3% (SD, 2.92) three months after the intervention. Mean pressure ulcer incidence remained the same during the preintervention and three-month postintervention periods: 0.33 (SD, 0.58) per month. Mean length of stay increased slightly from 4.78 (SD, 0.35) days before the intervention to 5.06 (SD, 0.18) days at three months after the intervention, which corresponded to a small increase in the institution's CMI, from 1.29 (SD, 0.07) before the intervention to 1.37 (SD, 0.1) at three months after the intervention.

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To help determine whether the impact of the program would be sustained, we collected four additional months of outcomes data. The unit's mean number of falls continued to decline to 3.14 (SD, 2.34) per month over the seven months following the intervention, and the mean monthly readmission rate was 18.1% (SD, 2.3), up from 17.3% at three months after the intervention but still below the preintervention rate of 19.7%. At seven months following the intervention, the mean monthly pressure ulcer incidence had declined slightly from the preintervention and three-month postintervention level of 0.33 (SD, 0.58) to 0.28 (SD, 0.49). Length of stay and institutional CMI remained relatively consistent from three to seven months postintervention.

After receiving positive responses from patients and staff about the benefits of the mobility protocol,

Table 3. Pre- and Postimplementation Early Mobility Program Outcomes Data (January–October 2012)

Patient Outcomes	Preimplementation (Jan–Mar)		3 Months Postimplementation (Apr–Jun)		7 Months Postimplementation (Apr–Oct)	
	Monthly Range	Mean (SD)	Monthly Range	Mean (SD)	Monthly Range	Mean (SD)
Falls, no.	3–8	4.33 (3.21)	2–4	3.33 (1.15)	0–7	3.14 (2.34)
Pressure ulcer incidence, no.	0–1	0.33 (0.58)	0–1	0.33 (0.58)	0–1	0.28 (0.49)
Readmission rate (within 30 days of discharge), %	16.6–21.6	19.7 (2.71)	15.6–20.7	17.3 (2.92)	15.6–21.3	18.1 (2.3)
Length of stay, days	4.42–5.11	4.78 (0.35)	4.86–5.22	5.06 (0.18)	4.53–5.22	4.88 (0.24)
Case mix index	1.21–1.35	1.29 (0.07)	1.27–1.46	1.37 (0.1)	1.24–1.46	1.31 (0.08)

the team decided to continue the protocol beyond the initial seven-month pilot.

DISCUSSION

The purpose of this quality improvement project was to determine whether an early mobility program could improve patient outcomes on a general medical unit. The project included the development of an early mobility protocol and use of a mobility aide whose primary role was to assist patients in performing specific activities determined by their ability to walk independently (denoted by their protocol activity tier). While length of stay and CMI remained relatively constant over the study period, we have seen a slight reduction in the number of patient falls and unplanned readmissions since we introduced the mobility program (however, we acknowledge that other factors, such as infection and patient discharge education, can affect readmission rates).

Unplanned hospital readmission rates are commonly used as an indicator of quality of care. Seven months after we implemented the mobility program, the unit's monthly readmission rate was 1.6% lower than it had been in the three months prior to program initiation. Since the estimated cost of a readmission at our institution is between $7,000 and $15,000, even a rate reduction of 1.6% could translate into substantial annual cost savings.

Likewise, a reduction in falls and pressure ulcer incidence can bring substantial cost savings. After program implementation, fall rates for the unit decreased by a mean 1.19 falls per month. In a retrospective case study of fall-related injuries in three Midwestern hospitals, a fall with serious injury was estimated to cost $13,316 and increase length of stay by 6.3 days.[15] A reduction in the mean number of falls by 1.19 could result in annual savings of as much as $190,152.

This project illustrates how tasks can be redistributed among a unit workforce to improve patient care. Nursing assistants on the unit are generally assigned 10 to 12 patients. After the role of mobility aide was established, the nursing assistant who functioned as our mobility aide was able to access patient records and document information pertinent to patient mobility. When not assisting patients with the mobility protocol, she was also able to assist other nursing staff by helping patients with tasks such as toileting and performing activities of daily living. This enabled the nurse manager to better align nursing assistant hours with unit census and patient acuity, without affecting patient-to-staff ratios, nursing assignments, or hours worked per patient day.

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Limitations. One limitation of this project was our inability to schedule a mobility aide for every day of the week because this role was assigned to a single nursing assistant. This may have contributed to our

patients' failure to attain optimal achievement scores, as patients may have been unable to perform daily mobility activities when the aide was not present to assist them. The mobility protocol is still in effect on the unit, and two nursing assistants now alternate in the role of mobility aide so that patients receive mobility assistance seven days per week. In addition, our protocol did not take into account that patients are often admitted late in the afternoon or discharged early in the morning. For such patients, three mobility activities on the day of admission or discharge may not have been feasible. Finally, we were limited in our ability to measure improvement or decline in patients' functional status.

The assignment of a designated staff member to the role of mobility aide helped ensure greater continuity of care.

CONCLUSION

Increasing patient mobility is an intervention that has repeatedly been shown to produce positive outcomes. Although other studies have identified fear of dislodging lines, tubes, and drains as barriers to patient mobility, no such adverse events were associated with mobility exercises during the study period in this mobility program. The results of this project are similar to those of other quality improvement projects conducted in ICUs and surgical units or focused on specific patient populations—we found that our mobility program could reduce falls, pressure ulcer incidence, and readmission rates.

One unique aspect of this program was the assignment of a designated staff member to the role of mobility aide, which helped ensure greater continuity of care. The aide developed therapeutic relationships with patients and their families and was familiar with patients' abilities and progress. In addition, as a designated staff member, she was able to assist patients in mobility activities and also in other activities within the scope of her practice as a nursing assistant.

This project demonstrates that a mobility program that incorporates a mobility aide can increase patient mobility and improve outcomes on a general medical unit. The protocol can be replicated on other acute care units. Additional research is needed to evaluate how early mobility protocols may affect a patient's quality of life and functional status after discharge. ▼

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