Outcomes of an Interprofessional Team Learning and Improvement Project Aimed at Reducing Postsurgical Delirium in Elderly Patients Admitted with Hip Fracture

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ABSTRACT

Background: Healthcare organizations face the challenge of improving the care provided to patients while simultaneously improving the individual and teamwork skills of the personnel who deliver this care. Interprofessional team learning and improvement (ITLI) is a learning format designed to address these objectives.

Method: Eisenhower Medical Center formed an ITLI team to address the problem of postsurgical delirium among its elderly patients admitted through the emergency department for hip fracture requiring surgical repair. The team was selected from among the professions and disciplines involved in providing care to these patients. The team used a blend of learning and quality improvement processes that included the following activities: reviewing literature, collecting and analyzing data, consulting with a technical expert, planning and implementing interventions designed to improve targeted outcomes, and measuring the effects of these interventions.

Results: The project was able to reduce the emergence of acute confusion among the targeted population by 64% and the use of restraints by 60% compared with a historical group of patients with similar characteristics. These outcomes were not statistically significant, probably owing to small numbers. However, staff members perceived advantages to the new approach to patient care and are expanding it to other relevant patient populations. Important professional development outcomes of the project included enhanced knowledge of hospital information technology resources, enhanced quality improvement skills, enhanced interprofessional relationships and teamwork skills, and experience with a new model for organizational problem solving. Organizational outcomes included new technology and clinical infrastructure that will make it easier to measure the effects of future interventions developed for this population, and an overall increased organizational capacity to solve complex problems through interprofessional teamwork.

Conclusion: ITLI shows promise as a format for improving the quality of care delivered to targeted populations while simultaneously developing individual and teamwork skills of participants.

INTRODUCTION

Healthcare organizations face multiple challenges as they strive to increase the quality of care and safety they provide to patients. Commensurate with this is the organization's responsibility for the continuing professional development of its staff members. Interdisciplinary teams are handling patient care more and more, which has implications for continuing professional development. This teamwork is often hampered by the tendency to train each discipline separately, emphasizing the unique role of each profession and discipline in patient care rather than how these professions and disciplines interact and collaborate in the process of delivering care. The traditional model has been questioned from a number of quarters, including the Institute of Medicine, which defined "working in interdisciplinary teams" as 1 of 5 core competencies for healthcare professionals [1]. The 6 core competencies initially adopted by the Accreditation Council for Graduate Medical Education and since adopted by the American Board of Medical Specialties as the underlying principle for Maintenance of Certification include the competency "System-Based Practice," signaling a move away from the autonomous practice model for physicians [2]. The Josiah Macy Foundation has called for basic reforms in how the health professions are educated, from initial training and throughout their careers, in ways that

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foster interdisciplinary collaboration [3,4,5]. Organizations such as the Centre for the Advancement of Intraprofessional Education have been established to articulate principles of intraprofessional learning and practice and to encourage research [6]. Six organizations representing the health professions in the United States have collaborated to develop competencies for interprofessional practice [7]. Continuing education generally resides within each profession's institutional structure, which creates additional barriers to responding to these initiatives. The renewed collaboration of the Accreditation Council for Continuing Medical Education, the Accreditation Council for Pharmacy Education, and the American Nurses Credential Center Commission on Accreditation for interdisciplinary accreditation is a hopeful sign of change [8].

Beginning in the 1990s, healthcare organizations saw the need to improve care at a systemic level, and thus they began to adopt and adapt quality improvement methods developed in the manufacturing sector [9]. While there have been ongoing attempts to link quality improvement to continuing education, these initiatives have generally focused on individual professionals rather than on interdisciplinary teams [2,10]. The conflict between the need to demonstrate individual responsibility in the maintenance-of-certification process and the fact that quality improvement is essentially a team-based activity continues to act as a barrier, although the Multi-Specialty MOC (Maintenance of Certification) Portfolio Approval Program may provide a model for balancing these needs [11].

Another concept from the business world that is ripe for incorporation into the healthcare sector is "action learning." Developed by Reginald Revans in the 1980s, action learning involves developing the skills of staff through their involvement in a project that addresses a need faced by the organization. Team members must have sufficient skills to engage in the assignment, but because learning is also a goal, it should also challenge them to develop

skills that they do not necessarily already possess. Appropriately selecting team members and providing technical and facilitation support to the team are key considerations when implementing this model [12]. We combined the "learning by doing" aspect of the action-learning model with quality improvement principles into a format that we call "Interprofessional Team Learning and Improvement" (ITLI). This format involves the professional development of an interprofessional team of healthcare professionals through their involvement in a project designed to improve the care delivered to patients. These projects are structured to include the following activities: reviewing and evaluating literature, collecting and analyzing data, identifying and consulting with experts, planning and implementing interventions, and evaluating the outcomes of the team's work.

The outcomes of this ITLI project were applied within Eisenhower Medical Center (EMC). Because ITLI has multiple goals, outcomes will be considered related to the following: the patient population addressed by the project, the professional development of team members, and the organization in terms of infrastructure and enhanced organizational capacity.

MATERIALS AND METHODS

Selection of the Focus for ITLI
EMC is located in a retirement community in southern California and serves a vulnerable elderly population at high risk for postsurgical delirium (PSD). PSD was chosen for this ITLI project at the suggestion of the patient safety officer as a priority issue, based on the population EMC serves. PSD complicates nursing care, increases the length of stay, and results in other long-term negative outcomes for patients [13-16].

Selection of the Team
A team was assembled that included representation from the following specialties: nursing (neurology and orthopedic), patient

safety, geriatrics, anesthesia, orthopedic surgery, and medical informatics. Staff from the Annenberg Center for Health Sciences at Eisenhower (Annenberg Center), an EMC-affiliated organization and continuing education provider, provided team facilitation and administrative support, and also provided physician and nursing continuing education credits for participation in planning meetings.

Study Phase
The team chose to focus on elderly patients admitted through the emergency department (ED) with a hip fracture requiring surgical repair. This population is at especially high risk for PSD because of the nonelective nature of the surgery. The team began meeting in October 2010.

Baseline Data Collection
Staff from the Annenberg Center performed a literature search, obtained relevant articles, and distributed them to team members. While all team members had access to all of the articles, individual team members were assigned the responsibility for reviewing literature related to their area of expertise and summarizing it for the team. Concurrently with the literature review, the team began to collect data to clarify current performance and to serve as a basis for measuring improvement. The team immediately ran into difficulties in identifying patients who had suffered delirium because the electronic health record (EHR) did not provide a place to record the emergence of delirium, forcing the team to rely on other indicators such as the use of personal attendants, use of restraints, and falls. The charts of these patients were reviewed for notes indicating that change in cognitive status had been observed. Because standardized assessments were not in use, the team loosened its definition from delirium to "acute confusion," which the team defined as "a change in cognitive status not present at baseline and serious enough to be recorded in the nursing or physician notes, and requiring some sort of intervention." When the team analyzed their baseline, they discovered that they had
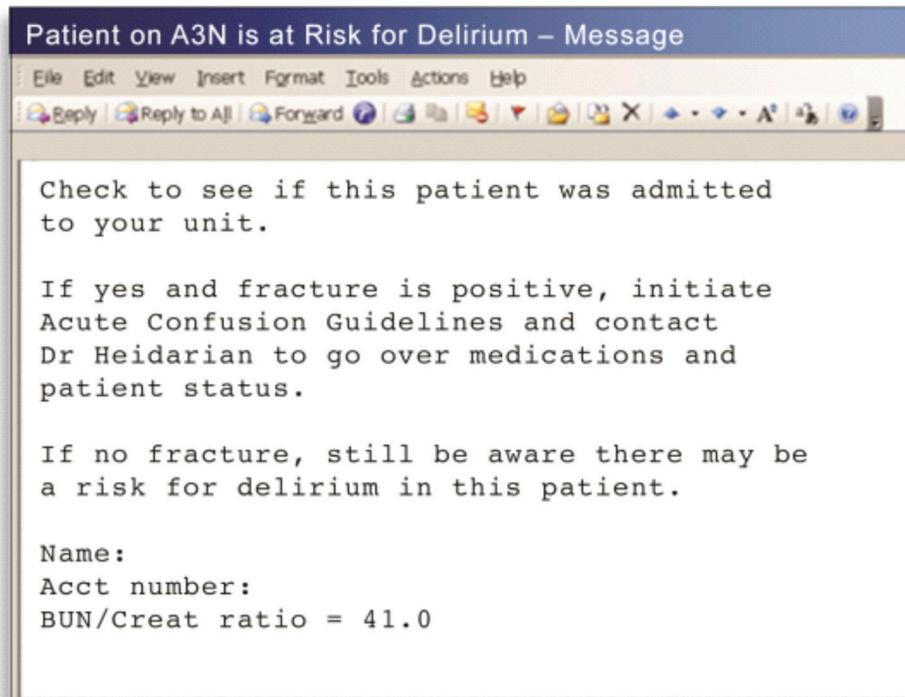
Figure 1. Example of a care alert message all charge nurses receive when an at-risk patient is admitted to one of their floors.

collected data for elective hip surgeries rather than patients admitted through the ED, a data collection error. We point this out in order to emphasize the role of learning within this format. This initial mistake helped team members gain a better understanding of the strengths and limitations of their data sources and their own limitations in collecting and using data, but also had the hidden benefit of helping them gain a broader context for the problem by examining how often acute confusion occurred within a broader population of hip surgery patients.

Consultation with a Technical Expert
On April 28, 2011, the Director of the Postoperative Delirium Service at the Veterans Affairs Boston Healthcare System, a geriatrician, visited EMC. During his visit, he presented a lecture on delirium during Grand Rounds and also met with the team to review the team's data and advise them on the development of the project.

Intervention Phase
The team began the project believing that the most likely interventions would be related to anesthesia management. However, the literature did not give clear direction for action despite this being a very active area of research. The expert confirmed this and recommended commonsense medical and nursing interventions that had some evidence for effectiveness.

Identifying Patients
As the team began planning interventions to improve care, the initial challenge was to identify the patients at risk for PSD. The solution proved to be technology based. The medical informatics group had the ability to program a "Care Alert" message that would send an e-mail to designated individuals every time a patient meeting defined criteria was admitted through the ED. The team chose criteria from a published model indicating higher risk for delirium based on admission criteria [17].

The criteria chosen included the following factors: radiograph of hip ordered, age ≥70 years, blood urea nitrogen/creatinine ratio ≥20, and/or serum albumin ≤2.5 g/L. When the Care Alert message was triggered, a team member would contact the ED to confirm that the patient met these criteria. All charge nurses were also alerted of an at-risk patient, should the patient be admitted to one of their floors (Figure 1).

Medical Management and Anesthesia Care
If the patient met criteria, the geriatrician on the team would review the patient's lab values and medication list, and then recommend changes to medical and medication management when appropriate. When feasible, a baseline cognitive assessment would be performed. The geriatrician would also notify the anesthesia staff that the patient was at high risk for PSD. While no specific anesthesia regimen was prescribed, regional anesthesia with sedation was preferred over general anesthesia and was administered with emphasis on correction of fluid and electrolyte imbalances, as well as judicious use of opioid analgesics.

Nursing Care
The floor that received all orthopedic surgery patients developed a new nursing care plan for these patients (Figure 2). The plan emphasized orientation to time and place, sleep hygiene, early mobility, and medication management. The EHR was also modified to include a standardized assessment for delirium and a place to record it when it emerged. Regular assessment for delirium was also added to the nursing workflow.

RESULTS
The team followed all patients meeting the Care Alert criteria between January and April of 2012 (n = 25) for the following outcomes: chart notes indicating the emergence of acute confusion, use of restraints, falls, the use of personal assistants for patients too confused to be left alone safely,
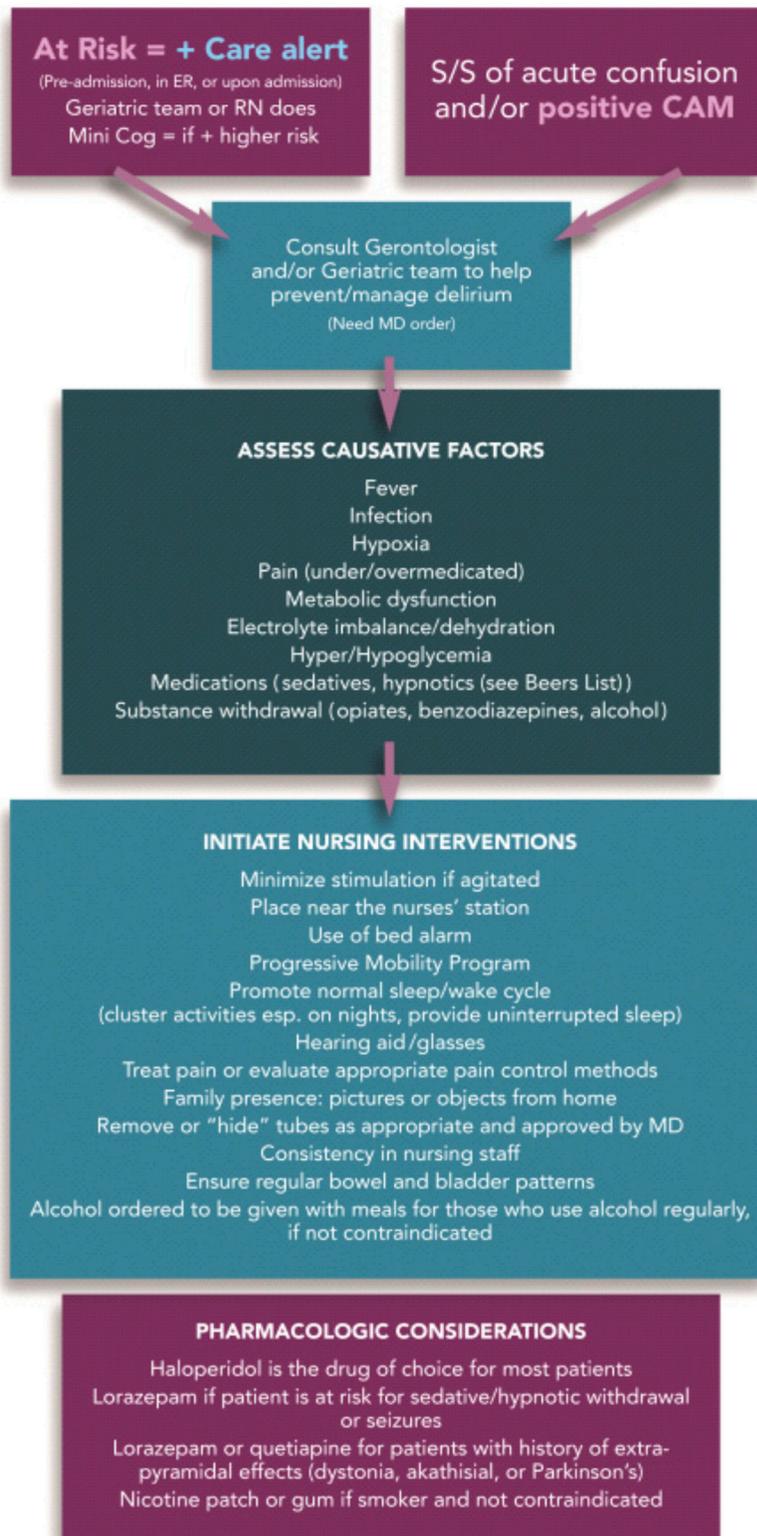
At Risk = + Care alert
(Pre-admission, in ER, or upon admission)
Geriatric team or RN does
Mini Cog = if + higher risk

S/S of acute confusion and/or positive CAM

Consult Gerontologist
and/or Geriatric team to help
prevent/manage delirium
(Need MD order)

ASSESS CAUSATIVE FACTORS
Fever
Infection
Hypoxia
Pain (under/overmedicated)
Metabolic dysfunction
Electrolyte imbalance/dehydration
Hyper/Hypoglycemia
Medications (sedatives, hypnotics (see Beers List))
Substance withdrawal (opiates, benzodiazepines, alcohol)

INITIATE NURSING INTERVENTIONS
Minimize stimulation if agitated
Place near the nurses' station
Use of bed alarm
Progressive Mobility Program
Promote normal sleep/wake cycle
(cluster activities esp. on nights, provide uninterrupted sleep)
Hearing aid/glasses
Treat pain or evaluate appropriate pain control methods
Family presence: pictures or objects from home
Remove or "hide" tubes as appropriate and approved by MD
Consistency in nursing staff
Ensure regular bowel and bladder patterns
Alcohol ordered to be given with meals for those who use alcohol regularly,
if not contraindicated

PHARMACOLOGIC CONSIDERATIONS
Haloperidol is the drug of choice for most patients
Lorazepam if patient is at risk for sedative/hypnotic withdrawal
or seizures
Lorazepam or quetiapine for patients with history of extra-
pyramidal effects (dystonia, akathisial, or Parkinson's)
Nicotine patch or gum if smoker and not contraindicated

Figure 2. The new nursing care plan that was developed for all orthopedic surgery patients by the staff on the floor that received them.

and length of stay, both with and without acute confusion. For comparison, the team reviewed the charts of all patients admitted during the same time period 3 years earlier who would have met the Care Alert criteria (n = 34). The results are displayed in the table . Chart notes indicating the emergence of acute confusion decreased by 64% and use of restraints by 60%. Only one fall was observed and it was in the enhanced care group. No personal attendants were needed in the enhanced care group, although they were rarely used in the comparison group. Length of stay was similar in both groups both with and without acute confusion. None of these results were statistically significant, which is likely due to the small sample size.

DISCUSSION

While this project did not produce statistically significant results, the hospital is nevertheless very satisfied with its outcomes and views it as a successful project. Anecdotally, nurses report that when postsurgical delirium does emerge, it tends to be less severe and of shorter duration. Nurses on the orthopedic unit are also far more aware of delirium risk factors, as well as the actions that they can take to prevent PSD and how to minimize its impact when it does emerge. The team is now looking at ways to expand the care model to other patient populations who are also at risk for PSD. An evaluation of a similar care plan using a larger group of patients should be performed to gain a better understanding of the effectiveness of these interventions.

Because of the hybrid model used, a number of other outcomes must be considered, both individual and organizational. Individual participants have increased their level of knowledge related to hospital's systems, including what data can be extracted, the limitations of what is available, and how a technological resource can be used to facilitate care. This knowledge is readily transferred into other settings, improving both individual effectiveness and organizational

Comparative Results of Enhanced Care Group and Historical Comparison Group*		
Outcome	Enhanced Care Group (n = 25)	Historical Comparison Group (n = 34)
Acute confusion	4 (16%)	11 (32%)
Use of restraints	2 (8%)	5 (15%)
Falls	1 (.04%)	0 (0%)
Use of personal assistants	0 (0%)	1 (2.9%)
Length of stay with acute confusion	6.5 days	6.6 days
Length of stay without acute confusion	4.6 days	4.9 days
*Differences are not statistically significant.		

capacity. Team members have also improved their skills related to reviewing and interpreting data, and then using those data to assess, monitor, and improve care. Another important outcome of this project is that new working relationships have been established among team members that are likely to be transferred into other venues. The project also has established a new model for solving problems within the organization. Two additional teams have been established since this project began: one team has designed and implemented a new approach to glycemic control in noncritical care patients, while another is addressing antibiotic stewardship in a specific patient population. The nursing interventions have been adopted by the staff on the floor that receives patients after orthopedic surgeries, as well as being incorporated into the care of all elderly patients, regardless of the procedure or whether or not it was performed on an elective or emergency basis. The project has also developed important infrastructure that will be useful when extending services to other patients at risk for PSD or delirium associated with medical illness. These include building a standardized assessment for delirium into the EHR, providing a specific place in the EHR for recording these assessments, and building regular assessment of cognitive status into the nursing workflow.

ITLI shows great promise for simultaneously developing the professional skills of individuals, building organizational capacity, and improving the quality of care provided to patients. Successful implementation of ITLI requires careful attention to the following factors: selection of an appropriate project, availability of individuals from appropriate professions and disciplines to staff the project, and ability to provide administrative and facilitation support to the team.

DISCLOSURE

ACKNOWLEDGEMENTS

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