FEASIBILITY OF DISCHARGE PLANNING IN INTENSIVE CARE UNITS: A PILOT STUDY

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Background Although there is widespread acceptance that hospital discharge planning should begin at hospital admission, early discharge planning is usually delayed for clinically unstable patients in intensive care units.

Objective This pilot study explored the feasibility of beginning the hospital's discharge planning process within 24 hours of an admission to the intensive care unit.

Methods Medical records of 15 patients were used to create case summaries generated from information available within 24 hours of admission to the intensive care unit. Twelve unit staff members (registered nurses, clinical nurse specialists, social workers, and discharge planning nurses) predicted the presence and absence of patient self-care deficits at hospital discharge and rated their confidence in making predictions.

Results More than half (55%) of patient self-care deficits present at hospital discharge were identified within 24 hours of admission to the unit. Although confidence in predicting deficits increased significantly when more information was available closer to hospital discharge for clinical nurse specialists and staff nurses, confidence for discharge planning nurses and social workers was as high for decisions based on admission information as it was for decisions based on information available at hospital discharge.

Conclusions The results provide a preliminary indication that staff in intensive care units may contribute to the early identification of patients' postacute care needs. The results also help to identify methods to study the discharge planning process within intensive care units. (*American Journal of Critical Care.* 2012;21:e94-e101)

H ospital discharge planning is an essential care process for facilitating a smooth transition of care from the hospital to another setting. Additionally, discharge planning is mandated under Medicare's conditions of participation to be extended universally to all hospitalized patients.[1] Early assessment on admission to the hospital provides the baseline information and preliminary structure for the discharge plan.[2] If the discharge planning process is not started early, the time available to prepare a plan that meets patients' increasingly complex continuing care needs may be insufficient, leading to poor discharge outcomes that are disruptive to patients and costly to the health care system.[3-6]

Although most patients are transferred from the intensive care unit (ICU) to other less acute units before hospital discharge,[7] assessing patients' needs and providing direction for continuity of care are integral facets of nursing care for ICU patients.[8,9] Although the literature generally agrees on this point, the notion of discharge planning in ICUs has come to be understood in the existing literature as the discharge from ICU to a less acute hospital unit (a step-down unit or general nursing care unit).[10-14] Hospital discharge planning (planning for discharge from the hospital to a postacute setting) is traditionally deferred for patients in the ICU because anticipating their postacute needs is difficult because of the patients' high acuity, the rapid changes in patients' conditions, and patients' uncertain recovery.[15,16] In addition, nurses report limited time to spend on hospital discharge planning and lack of knowledge and skills about the discharge planning process.

ICU survivors continue to be at greater risk for poor discharge outcomes (eg, rehospitalization or facility placement) than are patients who were not in the ICU during their hospitalization.[17] Few studies have been conducted, suggesting that ICU clinicians initiate the hospital discharge planning process before patients are transferred from the ICU to a less acute care unit.[7,13,15,18] The purpose of this pilot study was to determine the feasibility of beginning the hospital discharge planning process in the ICU by demonstrating the accuracy of clinicians' identification of self-care deficits when patients are admitted to the ICU.

Methods

A comparative descriptive study was conducted at the Mayo Clinic, a large academic medical center in Rochester, Minnesota, to determine whether experienced ICU staff could identify at admission patients' self-care deficits that would persist at hospital discharge. Orem's Self-Care Deficit Theory guided the study.[19] According to Orem's theory, a self-care deficit exists when an individual is incapable of independently meeting their self-care demands and requires assistance from another person.

Patient Sample and Case Summaries

After approval was acquired from the institutional review board, a random sample of medical records of 15 patients was obtained from a total of 200 randomly selected ICU patients who met inclusion criteria (patient was age 18 or older, first bed placement was in the ICU, and the patient had granted authorization for use of their medical record for research). The medical records of these patients were used to create case summaries. Medical records of patients who died before hospital discharge or were discharged to another hospital were excluded.

Development of the case summaries was patterned after Bowles and colleagues' studies of decision making related to postacute referral.[20,21] Two case summaries (1 admission, 1 discharge) for each patient were generated by the study investigators and reviewed

Nurses lack knowledge and skills about the discharge planning process.

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by an expert ICU clinician for clarity and completeness. The admission case summaries were based on any information available in the patient's electronic medical record before hospitalization (eg, health history, medical and surgical histories, and results of laboratory tests) and any information documented during the first 24 hours of the patient's ICU stay (see shaded box for an example of an admission case summary). The discharge case summaries were based on all information available throughout the hospital stay and were structured by using the same organizing domains as the admission case summaries. The case summaries were used to determine the accuracy of ICU staff members' predictions at admission of whether patient self-care deficits would exist at hospital discharge.

> Using case summaries, clinicians recorded whether any of 27 self-care deficits would be present at hospital discharge.

Clinician Sample

The names of experienced ICU clinicians were obtained by snowball sampling. Three participants from each of 4 roles—staff nurses, clinical nurse specialists, discharge planning nurses, and social workers—were enrolled in the study. These roles were selected because they were considered by the investigators to be key participants in the discharge planning process. It was anticipated that it would take approximately 1 hour for the clinician to review each case summary. Participants were remunerated $150 for the time spent reviewing a total of 30 case summaries.

Data Collection

Admission case summaries were distributed electronically to study participants. After reviewing each case summary, participants recorded whether each of 27 self-care deficits was likely to be present or absent at hospital discharge. Examples of self-care deficits included difficulty with meal preparation, bathing, mobility, ability to manage pain, and ability to use equipment. Participants were allowed to choose "not applicable" only for wound care, tube care, and use of equipment deficits. Additionally, participants reported their confidence in making each prediction by using an investigator-designed scale from 1 to 4, with 1 = not confident and 4 = extremely confident.

> Participants reported their confidence in predicting each self-care deficit.

At the end of each case summary review, the participants were asked "Based on the case summary, what information most influenced your prediction about deficits likely to be present at discharge?" Their responses were used to generate a list of the most important factors from the case summary that guided their predictions. After the experts completed their review of all case summaries, they were invited to attend a debriefing session held by a qualitative nursing scientist with the purpose of discussing study procedures, measures, and any burden related to participation in the study. They also discussed the important factors that influenced their decisions.

Data Analysis

Self-care deficit analysis was focused on clinicians' accuracy in predicting deficits by using information contained in the admission case summaries when compared with consensus determinations based on the discharge case summaries. Consensus was determined by using Bowles' method: each of the 27 deficits was deemed present or absent at discharge by 7 or more of the 12 clinicians (a simple majority) on the basis of the more complete information set (discharge case summary).[20,21]

Prediction Accuracy

Three measures of overall deficit prediction per case summary were calculated by comparing the 27 deficit assessments at admission for each expert with the consensus determinations. First, the percentages of deficits determined present by consensus that were also predicted present by the expert on the basis of admission information were calculated. For example, 5 deficits were present by consensus for case summary 1, all 5 of which were identified as present at admission by expert 1 (100% accuracy). Second, the percentages of deficits absent by consensus that were also predicted as absent at admission were calculated. For example, 22 deficits were absent by consensus for case summary 1, 15 of which were identified as absent at admission by expert 1 (68% accuracy). Third, the percentages where the admission and consensus assessments agreed across all 27 deficits were calculated. For example, 20 of the 27 deficit assessments for case summary 1 matched the consensus determinations for expert 1 (74% accuracy for deficits overall). These measures of overall deficit prediction were summarized for each expert. Prediction accuracy was then aggregated by role (eg, staff nurse, clinical nurse specialist, discharge planning nurse, social worker). Differences across expert roles were evaluated by using linear models with generalized estimating equations. This approach

Sample of admission case summary

Age, sex, race:
62-year-old white man

Health state
Motor vehicle accident: Mild closed head injury; right humeral neck fracture; C2 type III odontoid fracture
On admission to the emergency department: Patient was driver in a vehicle T-boned by an oncoming vehicle, at which point patient's car veered head-on into a light post. The patient was seen slumped over as he went through the intersection. The patient has no recollection of the accident. He has no history of seizure disorder or loss of consciousness episodes. His main complaint in the emergency department is pain in his right shoulder. His initial vital signs are a heart rate of 60/min and systolic blood pressure around 120 mm Hg, oxygen saturation was 99%, and his respiratory rate was 18/min. His airway is intact, the patient is conversing; his score on the Glasgow Coma Scale is 15. He has bilateral breath sounds and a palpable femoral/radial pulse. The patient has a mild abrasion on his left lateral thigh but otherwise has no signs of injury. Chest/pelvic radiographs are both negative for acute injuries. A focused assessment with sonography for trauma (FAST) exam did not reveal any free intraperitoneal fluid.
Comorbid conditions: Bilateral rotator cuff surgeries; chronic back pain; left total knee arthroplasty with previous arthroscopic surgery; left foot surgery; hyperlipidemia; migraine headaches; seizure; vitamin B_{12} deficiency; left foot fibroma; obesity; osteoporosis; had a T7 vertebroplasty and known T11 compression fracture; had L3-L4 lumbar fusion done elsewhere.
Medications before admission: Lidocaine patch twice a week as needed, alendronate 70 mg Mondays, multivitamin daily, calcium D daily, omeprazole 20 mg as needed at night, lisinopril 5 mg 2 tablets every 8 hours, dorzolamide eye drops twice daily in each eye, hydrocodone-acetaminophen 5-500 mg tablet as needed at night.
Progress note[a] in emergency department: Patient is alert and oriented in moderate distress because of right shoulder pain. He is unable to recall the accident. He is in a cervical collar; pupils are equal, round, reactive to light. There is no hemotympanum of either ear. Midface is stable with no malocclusion of the bite. Gross examination indicates that cranial nerve is intact. No cervical spine tenderness. Patient has chronic midthoracic back pain and had numerous spinal surgeries in the past. There appears to be no acute tenderness and certainly no step-off on exam. No tenderness with palpation of the thoracic cage; regular heart rate and rhythm with no murmurs. The patient's abdomen is obese, soft, with moderate focal tenderness in the epigastrium. No blood at the urethral meatus; normal rectal tone. No gross blood. The patient is moving all extremities; however, he does have pain with any movement of the right shoulder. He also relates pain to palpation of the left lateral thigh. Otherwise strength and sensation are intact throughout. Computed tomography of the head, cervical spine, chest/abdomen/pelvis, with reconstructed images of the thoracic and lumbar spine: no acute injury apparent other than what appears to be a right proximal humeral fracture.
Progress note on admission to intensive care unit: The events of the accident are still unclear, but it sounds as though the patient may have had a syncopal episode. His past medical history includes seizure as one of his medical problems; however, the patient denies any history of seizure activity. We will proceed with a full syncopal workup. No evidence of acute ischemia. Will monitor for any arrhythmias. Will keep the patient in total spine precaution until his thoracic and lumbar spine are cleared radiographically. Also as part of the syncopal workup, will obtain a transthoracic echocardiogram. Will check bilateral carotid ultrasound to rule out any carotid occlusive disease. Early screen for discharge planning score not available.
Progress notes 24 hours into stay in intensive care unit: Patient remains on bed rest. He is repositioned with assist of 4–tolerated fair. Score on Glasgow Coma Scale = 15, finger wiggles weak (-2), gross movement lower extremities bilaterally -2. Calm/alert; no delirium detected on Confusion Assessment Method, oriented x3, communicates clearly, nothing by mouth, bowel sounds active, urinary catheter inserted (urine clear, yellow), has an abrasion on his right forearm.

Developmental state: Before admission, reported some difficulty with dressing, walking, transfer, and bathing. Patient admits to using an assistive device. Communicating verbally and clearly; is alert and oriented.

Patterns of living: Lives with domestic partner. No history of substance use.

Environmental factors: Unknown

Health care system factors: No known hospitalizations in prior 6 months

Sociocultural factors: Single. Has some college or 2-year degree.

Socioeconomic factors: Patient has both commercial insurance and Medicare—mentions he has been seen through Veterans Affairs as well. Patient has not worked for past 2 years because of compression fractures.

[a] Progress notes include data from clinical notes, flow sheets, or other documentation from any discipline involved in patient's care.

models the measures of deficit prediction as a function of expert role after accounting for the correlated assessments within each case summary.

Confidence

Participants reported their confidence in predicting each self-care deficit on the admission and discharge case summaries. The differences in clinicians' confidence in assessing the deficits between the admission and discharge case summaries were evaluated by using paired t tests or Wilcoxon signed rank tests, depending on the distribution of the data. Statistical analyses were performed by using the SAS software package (SAS Institute, Cary, North Carolina). All tests were 2-sided, and P values less than .05 were considered statistically significant.

Influential Factors

The factors most influential in making a prediction were summarized by using content analysis to

Table 1
Sample characteristics of clinicians

Characteristic	Discharge planning nurse	Social worker	Staff nurse	Clinical nurse specialist	P
Age, mean (SD), y	51.0 (11.0)	28.3 (4.0)	40.0 (10.1)	50.7 (10.7)	.06
Experience at institution, mean (SD), y	17.3 (13.7)	4.2 (2.3)	14.3 (6.0)	23.3 (1.5)	.08
Experience in intensive care unit, mean (SD), y	1.7 (2.9)	1.8 (1.3)	15.7 (10.7)	23.3 (5.5)	.006
Female sex, No. (%)	3 (100)	3 (100)	3 (100)	3 (100)	NA

Abbreviation: NA, not applicable.

Table 2
Percentage of predictions based on admission case summaries with the consensus agreement overall and by role

| Role | Mean (SD); median; interquartile range; range | | |
	Present[a]	Absent[b]	Overall[c]
All clinicians	55 (36); 60; 25-87; 0-100	82 (18); 88; 71-96; 15-100	74 (12); 78; 67-81; 37-96
Clinical nurse specialist	45 (36); 36; 17-73; 0-100	83 (20); 89; 69-100; 15-100	71 (12); 74; 63-78; 41-89
Discharge planning nurse	50 (35); 48; 23-83; 0-100	83 (18); 90; 73-94; 25-100	74 (12); 78; 69-81; 48-96
Social worker	60 (35); 73; 40-87; 0-100	84 (14); 84; 75-94; 54-100	78 (9); 81; 74-85; 52-93
Staff nurse	63 (36); 75; 33-100; 0-100	79 (20); 86; 68-95; 27-100	73 (15); 74; 67-85; 37-96

[a] Present refers to admission deficit predictions that matched consensus determination of deficits present at discharge.
[b] Absent refers to admission deficit predictions that matched consensus determination of deficits absent at discharge.
[c] Overall refers to total admission deficit predictions matching the consensus assessment.

identify categories. The categories with the largest number of responses were validated as accurate with the participants in a debriefing session. Content analysis[22] of comments related to case summaries, instruments, and time to complete case summaries was performed after the participant debriefing session. Nvivo 9 (QSR International, Cambridge, Massachusetts) was used to code responses into categories.

Results

Characteristics of the clinician participants are presented in Table 1. All 12 clinicians were female. Mean (with standard deviation in parentheses) years of experience at the institution varied by role from 4.2 (2.3) years (social worker) to 23.3 (1.5) years (clinical nurse specialist). Years of ICU experience also varied widely from an average of 1.7 (2.9) years (discharge planning nurse) to 23.3 (5.5) years (clinical nurse specialist).

The average age of the 15 patients described in the case summaries was 65.9 (14.1) years (range, 41-89 year). Twelve (80%) were female, and 12 (80%) were white. Seven (47%) were married, seven (47%) had some college education. For 9 patients (60%), the admission to the ICU was planned after complex elective surgeries (cardiac, neurological, tumor resection). The remaining 6 patients' ICU admissions were for reasons that included a cardiac event, sepsis, motor vehicle accident, pulmonary edema, strangulated hernia, and a neurological event.

Predictive Accuracy

The mean (SD) percentages of prediction accuracy across all the clinicians were 55 (36) for self-care deficit present, 82 (18) for self-care deficit absent, and 74 (12) overall (Table 2). Some evidence indicated that the percentage of deficits accurately predicted as present differed by role ($P = .02$); specifically, the prediction accuracy of present deficits was lower for CNSs and discharge planning nurses than for social workers and staff nurses. No statistically significant difference was found between roles in the percentage of deficits accurately predicted as absent ($P = .54$). Last, roles differed significantly in the percentage of predictions overall (present and absent deficits, $P = .04$); specifically, this aggregate measure of overall deficit prediction was higher for social workers than for other roles.

Confidence

Confidence in predicting deficits was high. Confidence in deficit prediction increased significantly

from admission to discharge for clinical nurse specialists and staff nurses (Table 3). Although one would expect confidence in predicting deficits to increase from the admission to discharge case summaries, the confidence of social workers and discharge planning nurses in their decisions was as high when they used information from the admission case summaries as when their decisions regarding deficits were based on the discharge case summaries. In addition, clinicians noted that predictions were easier to make when the population of patients was familiar to them.

Influential Factors

During the debriefing session, the clinicians identified several data elements as important in predicting self-care deficits at hospital discharge early during the ICU stay. Influential variables included the reason for hospitalization, prior and current functional status, and the availability of informal caregiver assistance at home.

Discussion

Beginning the discharge planning process is often assigned a lower priority among competing care requirements for complex, critically ill patients.[2,15,23] This fosters a tendency for ICU staff to wait until the patient's condition has stabilized to start discharge planning.[7] Findings from this study suggest that ICU staff in key roles and as key persons with a stake in the hospital discharge planning process can predict self-care deficits accurately and confidently. Among the 4 groups of clinicians, ICU staff nurses were best able to predict self-care deficits likely to be present at hospital discharge by using admission data.

Although all experts were able to predict self-care deficits that were likely to be present at discharge to some extent, prediction of deficits that were not likely to be present seem to be an easier decision, perhaps because of the clinicians' understanding of the effect of the condition on functioning. For example, a fractured femur in an otherwise healthy adult is not likely to result in cognitive deficits. Because of the complex care needs of ICU patients, it is important that clinicians be able to rule out variables that are extraneous to the discharge plan. Future studies with larger and more diverse samples should be done to evaluate key data elements that clinicians consider important in predicting deficits that are likely to be present as well as deficits that are not likely to be present.

Despite the belief that discharge planning is not appropriate for critically ill or unstable ICU patients, clinicians had high levels of confidence in their

Table 3
Confidence ratings of predictions based on admission case summaries and determinations based on discharge case summaries

Role	Confidence,[a] mean (SD)		
	Admission	Discharge	P
Clinical nurse specialist	2.6 (0.6)	3.2 (0.6)	<.001
Discharge planning nurse	2.7 (0.5)	2.8 (0.4)	.80
Social worker	2.6 (0.8)	2.6 (0.9)	.38
Staff nurse	2.6 (0.7)	3.1 (0.6)	<.001

[a] Confidence scale: 1 = not confident, 2 = somewhat confident, 3 = very confident, 4 = extremely confident.

ability to identify deficits at discharge by using only information available at admission. Discharge planning nurses and social workers had less change in their confidence, which may be explained by their role-specific focus on discharge planning concerns. Because of the effectiveness of the ICU staff nurses in identifying likely deficits, the findings suggest involving specialized discharge planning resources with ICU staff nurses early in patients' ICU stay.

Reason for hospitalization, as well as prior and current functional status, were influential factors identified by study participants. These findings are similar to factors associated with hospital discharge to a care facility in survivors of a critical illness.[24] Low physical functioning is an indication that further rehabilitation may be necessary for surgical ICU patients.[25] Functional status before admission to a medical ICU has been linked to functional status after hospital discharge for elderly patients.[26] These factors deserve further study as candidates for discharge planning decision support for ICU patients.

Methodological lessons learned from this pilot study include information about recruitment and the development and use of case summaries. Recruitment of experienced clinicians familiar with ICU patients by snowball sampling is possible, but requires consideration of several factors. First, it is imperative to include study participants who are experienced with interpreting extensive and complex care needs in order to integrate and analyze data in a discharge planning schema. Second, when recruiting from a large hospital with multiple ICUs for specific clinical populations (medical, neurological, cardiovascular), clinicians who are familiar with particular populations of patients are more confident in their predictions. Third, debriefing comments from

> Prediction accuracy of deficits was lower for clinical nurse specialists and discharge planning nurses than for social workers and staff nurses.

the participants indicated that the physical therapist plays a key role in the ICU discharge planning process. The therapists' assessments of functional status are important to participants' confidence in predicting deficits at discharge. Subsequent studies should include physical therapists as study participants. When asked about physicians' involvement in the discharge planning process, the study participants confirmed that physicians were not key participants in the discharge planning process, although physicians' documentation was often key in understanding the clinical course and likely outcomes for patients.

> **Intensive care unit staff in key roles can predict self-care deficits accurately and confidently.**

Participation was feasible and considered a positive experience by the experts. All the experts completed the reviews as requested. It was reasonable to remunerate clinicians for study participation, recognizing that what was required by the study was beyond their existing role responsibilities. The participants reported that the remuneration provided was acceptable in relationship to the time required to review the case summaries.

Development and use of case summaries is feasible for studying the identification of self-care deficits, as described by Bowles and colleagues.[20,21] The process of developing the case summaries for this study required the investigators to abstract pertinent data from the medical record. Development of case summaries would be more efficient if the required data elements were available as discrete values that could be easily retrieved electronically.

> **Reason for hospitalization and prior and current functional status were influential factors in predictions.**

Limitations of this study need to be considered. This was a small sample pilot study, and the main objective was to determine feasibility of methods for a subsequent full-scale study rather than to obtain definitive results. Although the small sample size calls into question the validity of the results, few studies have been conducted, to date, that focus on the hospital discharge planning process within the ICU setting. The findings may guide the thinking of other investigators and contribute to our knowledge regarding the conduct of discharge planning within acute care.

Conclusion

Shortened hospital stays, including both the ICU stay and the subsequent time on the step-down or general care unit, can result in precious little time to identify patients' increasingly complex postacute care needs, to develop a plan, to discuss the plan with the patient, the patient's family, and other providers, and to implement the plan. Nurses are encouraged to start the discharge planning process at the time of a patient's admission to the hospital regardless of whether or not the patient begins the hospital stay in an ICU. Early assessment in the ICU of potential deficits is consistent with recommendations for maximizing patients' functioning after critical illness.[27] This early start to the discharge planning process enhances the timely organization, engagement, and coordination of resources needed for a successful discharge plan. An early start does not preclude adjusting the plan on the basis of changes in the patient's condition, but delaying initiation of the discharge planning process further compresses the time available to identify and anticipate needs, and to discuss, develop, and implement a plan.

This pilot study provides preliminary evidence for the feasibility of using information documented within 24 hours of a patient's ICU admission to initiate the discharge planning process, and it calls for further study of early discharge planning for critically ill patients with complex needs. Findings from this study suggest the possibility that ICU nursing staff can contribute to the identification of patients' postacute care needs. Early collaboration with specialized discharge planning resources such as discharge planning nurses or social workers may result in an improved process and decreased risk of costly, poor discharge outcomes. Patient data elements available early in an ICU stay identified as important in predicting self-care deficits at hospital discharge may serve as a relevant starting point in developing much needed discharge planning decision support to assist ICU clinicians in participating in patient-centered discharge-related care planning.

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