Comprehensive Discharge Planning for the Hospitalized Elderly

A Randomized Clinical Trial

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■ *Objective:* To study the effects of a comprehensive discharge planning protocol, designed specifically for the elderly and implemented by nurse specialists, on patient and caregiver outcomes and cost of care.

■ *Design:* Randomized clinical trial.

■ *Setting:* Hospital of the University of Pennsylvania.

■ *Patients:* 276 patients and 125 caregivers. Patients were 70 years and older and were placed in selected medical and surgical cardiac diagnostic-related groups.

■ *Measurements:* Group differences in patient outcomes (length of initial hospital stay, length of time between initial hospital discharge and readmission, and rehospitalization rates) and charges for care (charges for initial hospitalization, rehospitalizations, health services after discharge, and nurse specialist services) were measured 2, 6, and 12 weeks after discharge.

■ *Results:* From the initial hospital discharge to 6 weeks after discharge, patients in the medical intervention group had fewer readmissions, fewer total days rehospitalized, lower readmission charges, and lower charges for health care services after discharge. No differences in these outcomes were found between the surgical intervention and control groups during this period.

■ *Conclusions:* Study findings support the need for comprehensive discharge planning designed for the elderly and implemented by nurse specialists to improve their outcomes after hospital discharge and to achieve cost savings. The findings also suggest that this intervention had its greatest effect in delaying or preventing rehospitalization of patients in the medical intervention group during the first 6 weeks after discharge.

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More than 10 million Medicare beneficiaries were discharged from hospitals in 1990 (1). This number is expected to increase substantially over the next few decades. The average hospital stay for an elderly patient in 1991 (8.5 days) was approximately 1.8 days shorter than that in 1981, an 18% reduction (2). Although no evidence suggests that earlier hospital discharge harms the health of elderly patients, little doubt exists that their care after discharge places a difficult burden on families and the health care system (3, 4).

A national study of the effect of the Prospective Payment System indicated that the number of elderly patients discharged in unstable conditions has increased across the board rather than in any specific patient or hospital subgroup (5). Additional research findings suggest that some elderly patients discharged from hospitals may require care too complex for families to manage alone (6–8).

Earlier hospital discharge has been associated with substantial growth in the number and breadth of services available after discharge for Medicare beneficiaries, including emergency room visits, acute care visits to physicians, and home visits by registered nurses (2, 9). Despite efforts to control costs, home health care expenditures for elderly patients increased 583% from 1980 to 1991 (2). Rehospitalizations of Medicare beneficiaries currently account for at least one quarter of all hospital admissions (10–12).

As a public program and the largest single payer for health care, Medicare plays a central role in the current health care debate. It is an obvious target for major budget savings. Increasing pressure to contain costs further raises serious concerns about the continued access of elderly patients to the care they need and the quality of that care (13). A critical need exists for interventions that facilitate the discharge of elderly patients to their homes, that prevent poor outcomes after discharge, and that reduce health care costs.

Effective discharge planning can facilitate the timely discharge of elderly patients and ensure that appropriate care is available in the home to prevent readmissions, to lessen the burden of care on families, and to reduce costs (14). The elderly need quality discharge planning because, at any given time, they occupy more than 34% of hospital beds, are substantial users of services after discharge, and are at high risk for poor outcomes after discharge (1, 6, 15). Unfortunately, a national panel of experts rated the quality of discharge planning available for this group as very poor (16).

Several approaches to improve discharge planning for elderly patients have recently been tested (17–19). Our study, an adaptation of a discharge planning and home follow-up program by nurse specialists (20), also builds

on an earlier study of the effects of a discharge planning protocol developed for the elderly (17, 21). The purpose of our study was to determine the effects of a comprehensive discharge planning protocol designed specifically for the elderly and implemented by nurse specialists on patient and caregiver outcomes and charges for care.

Methods

Study Sample

Eligible patients were 70 years and older, were admitted from their homes to the Hospital of the University of Pennsylvania, and were from selected medical and surgical diagnostic-related groups (DRGs). Patients were randomly assigned to an intervention or control group. The medical DRGs were congestive heart failure and angina/myocardial infarction. Surgical DRGs were coronary artery bypass graft and cardiac valve replacement. In addition, patients had to speak English, be alert and oriented when admitted, and be able to be reached by telephone after discharge.

Caregivers, persons identified by patients as those who would assume primary responsibility for their care after discharge, were also enrolled. Patients who did not identify a caregiver were included in the study.

Control Group

Patients in the control group received the hospital's routine discharge plan, which is used for patients of all ages and diagnostic classifications. Criteria-based screening of all hospital admissions normally occurred within 48 hours of admission. Uncomplicated discharges were managed by the patient's physician and primary nurse. Complicated discharges, which necessitated coordination of services and external providers, involved social workers and community nursing coordinators employed by the hospital. Discharge planning services were provided in accordance with the medical plan of care.

Intervention Group

Patients and caregivers in the intervention group received the hospital's routine plan and a comprehensive, individualized discharge planning protocol developed specifically for elderly patients and implemented by gerontologic clinical nurse specialists (*see* Appendix). The protocol extended from hospital admission to 2 weeks after discharge. Compared with the hospital's routine procedure, the discharge planning protocol included the following unique features: 1) comprehensive initial and ongoing assessment of the discharge planning needs of the elderly patient and his or her caregiver; 2) development of a discharge plan in collaboration with the patient, caregiver, physician, primary nurse, and other members of the health care team; 3) validation of patient and caregiver education; 4) coordination of the discharge plan throughout the patient's hospitalization and through 2 weeks after discharge; 5) interdisciplinary communication regarding discharge status; and 6) ongoing evaluation of the effectiveness of the discharge plan.

Two half-time nurse specialists with master's degrees in gerontologic nursing and a minimum of 1 year of practice as a nurse specialist were hired to implement the comprehensive discharge planning protocol for patients in the intervention group. Within 24 to 48 hours of admission, the nurse specialist visited the patient and contacted the caregiver to complete the initial patient and caregiver assessment and to document the preliminary discharge plan.

The nurse specialist visited the patient every 48 hours thereafter to implement the plan through patient and caregiver education, referrals, consultation with health care team members, counseling, and coordination of home services. The final visit was made within 24 hours of discharge to finalize discharge preparations. Summaries of the discharge plan were recorded in the patient's chart and distributed to the patient, primary care physician, and other health care team members who would care for the patient at home.

In addition to personal visits, the nurse specialist was available 7 days a week by telephone (8 a.m. to 10 p.m. on weekdays; 8 a.m. to 12 p.m. on weekends) throughout the patient's hospitalization and for 2 weeks after discharge for any questions or concerns from the patient, caregiver, or health care team member that were relevant to the discharge plan. The nurse specialist also initiated a minimum of two telephone calls during the first 2 weeks after discharge to monitor the patient's progress and intervene when necessary.

Statistical Analysis

The chi-square or the Fisher exact test and independent *t*-tests were completed where appropriate. Ninety-five percent CIS were calculated for differences between means or differences between percentages. All P values are two-tailed.

Because all patients had their index hospitalizations at the same site, actual charge data were used to calculate the cost of initial hospitalizations. Patients were readmitted, however, to various large teaching and small community and rural hospitals. Because of the wide range of charges at these settings, rehospitalization charges were calculated using the mean charge per day for the index hospitalizations for the medical DRG group times the actual number of days of subsequent hospitalizations.

The total charges for health care services after discharge incurred by patients in our study were calculated for all study groups. These included charges for rehospitalizations; visits by patients to emergency rooms, physicians' offices, or clinics; visits to patients' homes by nurses, allied health professionals, or home health aides; and the services of the nurse specialists (intervention group only). With the exception of readmission charges, actual charge data were used to calculate the cost of health services after discharge.

The charges for the nurse specialists' services were based on the time devoted to the discharge planning intervention. The time spent in the direct care of patients and their caregivers (for example, patient education) and indirect care (for example, coordinating services after discharge) was measured and converted to charges using a competitive compensation base (salary plus fringe benefits) for nurse specialists in the same geographic area.

Results

Of the 364 patients enrolled between July 1989 and February 1992, 36 died (17 patients in the intervention group and 19 patients in the control group) and 52 either changed their minds about participating in the study or were unable to be contacted after discharge. Eighty-one percent of the deaths occurred during the initial hospitalization (n = 22) or the week immediately after discharge (n = 7).

Patients in the final study sample (n = 276) and the attrition group (n = 88) were similar respecting all sociodemographic variables except age (P = 0.002) and employment status (P = 0.04). The mean age of patients in the study sample was 75.5 years, compared with a mean age of 77.5 years in patients in the attrition group; in the study sample, 80% of patients were not employed, compared with 90% of patients in the attrition group. The health status of patients in the study and attrition groups was also similar at hospital admission as measured by the Medis Group Severity of Illness scores, the total number of comorbid conditions, the number of prescribed daily medications, and the number of hospital admissions during the previous 6 months.

The final study sample also included 125 caregivers. Forty-seven patients (20 in the intervention group and 27 in the control group) did not identify a caregiver.

Table 1. Characteristics of Hospitalized Elderly Patients in Medical and Surgical Diagnostic-related Groups

Characteristic	Medical DRG*		Surgical DRG	
	Intervention Group (n = 72)	Control Group (n = 70)	Intervention Group (n = 68)	Control Group (n = 66)
Demographic characteristics				
Mean age, y	76 ± 5.2	76 ± 4.9	75 ± 4.4	75 ± 4.3
Male sex, %	57	41	82	61
Education (high school or more), %	62	64	78	75
Marital status (married), %	50	41	71	58
Ethnicity (white), %	61	69	97	98
Employment (not working), %	86	83	76	74
Annual income, $				
< 10 000, %	44	38	17	32
10 000–20 000, %	26	21	29	14
> 20 000, %	30	41	54	54
Health status				
Medis severity score	1.4 ± 0.9	1.3 ± 1.0	1.2 ± 0.9	1.1 ± 0.8
Comorbid conditions, n	3.9 ± 1.5	3.8 ± 1.7	3.3 ± 1.4	3.2 ± 1.5
Prescribed medication, n	4.7 ± 3.0	4.1 ± 2.8	4.5 ± 2.7	4.2 ± 2.4
Rehospitalizations during previous 6 months, n	1.0 ± 1.2	0.7 ± 1.1	1.3 ± 1.3	1.4 ± 1.5

* DRG = diagnostic-related group. Means are expressed ± SD.

Either the remaining caregivers refused to participate in the study or the patients did not want their caregivers enrolled.

The medical DRG sample consisted of 72 patients and 26 caregivers in the intervention group and 70 patients and 18 caregivers in the control group. The surgical DRG sample included 68 patients and 48 caregivers in the intervention group and 66 patients and 33 caregivers in the control group. With the exception of patients placed in the cardiac valve replacement DRG (28 patients in the intervention group and 23 patients in the control group), patients were equally distributed among DRGs.

The medical intervention and control groups were similar regarding all sociodemographic variables (Table 1). The surgical intervention and control groups were similar in all sociodemographic variables except sex (P = 0.005) (Table 1). The health status of patients in both the medical and surgical intervention and control groups at hospital admission was similar as measured by the Medis Severity of Illness scores, the total number of comorbid conditions, the number of prescribed daily medications, and the number of hospital admissions during the previous 6 months (Table 1).

Length of Initial Hospital Stay and Charges

In the medical group, the mean length of stay and charges for the initial hospitalization for patients in the intervention group were similar to the means for the control group (Table 2). In the surgical group, the mean length of stay and charges were greater than those for the medical group, but again the means for the intervention and control groups were similar (Table 2).

Length of Time between Initial Discharge and Readmission

The mean length of time between the index hospital discharge and readmission for patients in medical DRGs was 45.6 days for the intervention group and 31.0 days for the control group, a difference of 14.6 days (P = 0.12). For patients in surgical DRGs, the mean length of time between the index hospital discharge and readmission was 28.9 days for the intervention group and 21.4 days for the control group, a difference of 7.5 days (P = 0.34).

Rehospitalizations of Patients in Medical Diagnostic-related Groups

During the initial 2-week period after discharge, 3 patients (4%) in the medical intervention group were readmitted, compared with 11 patients (16%) in the control group (P = 0.02) (Table 3). For the intervals from 2 to 6 weeks and from 6 to 12 weeks after discharge, the percentages of patients readmitted were similar for the intervention and control groups.

When cumulative data are considered, 10% of patients in the medical intervention group were readmitted during the first 6 weeks after discharge compared with 23% of control patients (P = 0.04; 95% CI for the difference, −25% to −1%). Twelve weeks after discharge, 22% of the intervention group had been rehospitalized compared with 33% of the control group (P = 0.15; CI for the difference, −26% to 4%).

Two weeks after discharge, the 3 readmissions in the intervention group and 10 of the 11 readmissions in the control group were verified by physicians to be directly related to the index hospitalizations. Between 2 and 6 weeks after discharge, 2 of the 4 readmissions in the intervention group and 6 of the 7 readmissions in the control group were verified to be related to the index hospitalizations. Between 6 and 12 weeks after discharge, 7 of the 11 readmissions in the intervention group and 8 of the 11 readmissions in the control group were verified to be directly related to the index hospitalizations.

The primary reasons for the 36 related readmissions for the medical intervention and control groups were

Table 2. Length of Stay and Charges for Index Hospitalization by Medical and Surgical Diagnostic-related Group

Variable	Intervention Group	Control Group	Difference† (95% CI)
Medical DRG*			
Patients, *n*	72	70	
Mean length of stay, *d*	7.4 ± 3.8	7.5 ± 5.2	−0.1 (−1.6 to 1.4)
Range	2–18	2–36	
Total	535	528	
Mean charges, $	24 352 ± 15 920	23 810 ± 18 449	542 (−5121 to 6205)
Range	4191–76 490	6458–93 083	
Total	1 753 356	1 666 682	
Surgical DRG			
Patients, *n*	68	66	
Mean length of stay, *d*	15.8 ± 9.4	14.8 ± 8.3	1.0 (−2.0 to 4.0)
Range	7–59	7–54	
Total	1074	977	
Mean charges, $	105 936 ± 52 356	98 640 ± 52 331	7296 (−5141 to 19 733)
Range	52 424–381 439	52 310–374 534	
Total	7 203 684	6 510 238	

*DRG = diagnostic-related group.
† Difference is the value for the intervention group minus the value for the control group. Mean values are ± SD.

similar: congestive heart failure, angina, adverse drug reactions, repeat angioplasty, and myocardial infarction.

Rehospitalizations of Patients in Surgical Diagnostic-related Groups

The number of readmissions reported by the surgical intervention and control groups was similar between the index hospital discharge and 2 weeks, between 2 and 6 weeks, and between 6 and 12 weeks after discharge (Table 4).

Because study patients were randomly assigned to groups that were similar in all health status variables at admission and all sociodemographic variables except sex, it might be expected that the intervention and control groups would experience a similar number of health problems shortly after discharge that would affect outcomes after discharge. In our study, however, patients in the intervention group (26%) reported a higher infection rate between the index hospital discharge and 2 weeks after discharge than did patients in the control group (8%) ($P = 0.004$). When we controlled for differences in infection rates between the surgical intervention and control groups, the prevalence of readmissions in the intervention group 2 weeks after discharge (17%) was less than half that of the control group (40%). Although the difference is sizable, it is not significant ($P = 0.26$), perhaps because power for this comparison is only 28%.

Two weeks after discharge, all of the readmissions in both the surgical intervention and control groups were verified by physicians to be directly related to the index hospitalizations. Between 2 and 6 weeks after discharge, four of the seven readmissions in the intervention group and eight of the nine readmissions in the control group were verified to be directly related to the index hospitalizations. Between 6 and 12 weeks after discharge, five of the seven readmissions in the intervention group and two of the five readmissions in the control group were verified to be directly related to the index hospitalizations.

The primary reasons for the 31 related readmissions for patients in the surgical intervention group and control patients were similar: congestive heart failure, wound infection, pneumonia, pulmonary emboli, adverse drug reactions, and cardiac arrhythmia.

Table 3. Rates for First Rehospitalization, Total Days, and Total Charges for Patients Placed in Medical Diagnostic-related Groups in Three Time Intervals after Discharge

Variable	Intervention Group ($n = 72$)	Control Group ($n = 70$)	Difference (95% CI)
Rehospitalizations, *n* (%)			
Within 2 weeks	3 (4)	11 (16)	−12% (−22% to −2%)
2–6 weeks	4 (6)	7 (10)	−4% (−9% to 7%)
6–12 weeks	11 (15)	11 (16)	−1% (−8% to 12%)
Total duration of rehospitalization, *d*			
Within 2 weeks	21	73	−52 (−78 to −26)
2–6 weeks	16	49	−33 (−53 to −13)
6–12 weeks	94	100	−6 (−83 to 71)
Total charges, $*			
Within 2 weeks	68 754	239 002	−170 248 (−253 to −87)
2–6 weeks	52 384	189 892	−137 508 (−210 to −67)
6–12 weeks	471 456	340 496	130 960 (−205 to 467)

* Confidence intervals for charges are in thousands of dollars.

Table 4. Rates for First Rehospitalization, Total Days, and Total Charges for Patients in Surgical Diagnostic-related Groups for Three Time Intervals after Discharge

	Intervention Group (n = 68)	Control Group (n = 66)	Difference (95% CI)
Rehospitalizations, n (%)			
Within 2 weeks	5 (7)	7 (11)	−4% (−14% to 6%)
2–6 weeks	7 (10)	9 (14)	−4% (−16% to 8%)
6–12 weeks	7 (10)	5 (7)	3% (−7% to 13%)
Total duration of rehospitalization, d			
Within 2 weeks	34	32	2 (−13 to 17)
2–6 weeks	63	52	11 (−20 to 52)
6–12 weeks	52	26	26 (−8 to 60)
Total charges, $*			
Within 2 weeks	111 316	104 768	6548 (−43 to 56)
2–6 weeks	209 536	170 248	39 288 (−66 to 144)
6–12 weeks	170 248	85 124	85 124 (−28 to 198)

* Confidence intervals for charges are in thousands of dollars.

Other Patient and Caregiver Outcomes

Medical and surgical intervention and control groups were similar in functional status, mental status, perception of health, self-esteem, and affect, which were outcome variables measured 2 weeks after discharge, between 2 to 6 weeks after discharge, and between 6 to 12 weeks after discharge. These groups were also similar in the number of emergency room visits or visits to physicians (routine or acute care) made after hospital discharge.

Regardless of study group, patients reported a decline in functional status during the initial 2-week period after discharge compared with the hospital admission baseline. During this period, the mean Enforced Social Dependency Scale scores increased from 19.6 to 26.3 ($P < 0.001$). This increase of 6.7 points represents a decline in functional status. Twelve weeks after discharge, the functional status scores of patients in all groups approached the baseline.

Study groups had similar caregiver outcomes, including functional status, caregiving demands, affect, and family functioning. Patients and caregivers in both groups rated the quality of discharge preparation as highly satisfactory.

Charges for Rehospitalizations

Because several patients in both study groups had several rehospitalizations, we considered only the length of stay and charges for the first rehospitalization during each period to maintain independence of observations. Histograms were completed to examine group differences in lengths of hospital readmission stays. No obvious outliers were found in the medical or surgical groups that would affect the results.

The total days of rehospitalization for the medical intervention group were less than those for the control group 2 weeks after discharge ($P = 0.002$) and between 2 to 6 weeks after discharge ($P = 0.01$) but were similar between 6 to 12 weeks after discharge (Table 3).

Total charges for the medical intervention group readmissions were lower than those for the control group by \$170 248 at 2 weeks after discharge ($P = 0.001$) and lower by \$137 508 between 2 and 6 weeks after discharge ($P = 0.001$) (Table 3). Charges were similar for the two medical study groups between 6 and 12 weeks after discharge. For the surgical intervention and control groups, total days of rehospitalization and total charges were similar at 2 weeks, between 2 and 6 weeks, and between 6 and 12 weeks (Table 4) after discharge.

Charges for Health Services after Discharge

Total charges for health care services 2 weeks after discharge for the 72 patients and 26 caregivers in the medical intervention group were \$163 858 less than charges for the 70 patients and 18 caregivers in the control group ($P = 0.08$) (Table 5). The mean charges for services in the intervention group (\$1237) were \$2376 less than those for the control group (\$3613) ($P = 0.06$).

Total charges for health care services from 2 to 6 weeks after discharge for the medical intervention group were \$131 740 less than charges for the control group ($P = 0.10$) (Table 5). The mean charges for services in the intervention group (\$1216) were \$1917 less than those for the control group (\$3133) ($P = 0.08$).

When cumulative data are considered, total charges for health care services after discharge at 6 weeks for the medical intervention group were \$295 598 less than charges for the control group ($P = 0.02$). The mean charges for the intervention group 6 weeks after discharge were \$2453, compared with \$6746 for the control group ($P = 0.01$). Charges for health care services between 6 and 12 weeks after discharge were similar for the intervention and control groups.

Although patients in the surgical intervention group had a higher infection rate immediately after they were discharged, charges for services after discharge were similar for surgical patients from initial discharge to 2 weeks, from 2 weeks to 6 weeks, and from 6 weeks to 12 weeks after discharge (Table 5).

Charges for Nurse Specialists' Services

The nurse specialists had a mean of 4.8 personal visits and telephone contacts with patients and caregiv-

Table 5. Charges for Health Services in Three Time Intervals for Patients in Medical and Surgical Diagnostic-related Groups after Discharge

Variable	Intervention Group	Control Group	Difference (95% CI†)
Medical DRG*			
Patients, *n*	72	70	
Total charges, $			
Within 2 weeks	89 088	252 946	−163 858 (−246 to −81)
2–6 weeks	87 559	219 299	−131 740 (−292 to −132)
6–12 weeks	501 770	360 127	141 643 (−606 to 323)
Costs of nurse specialists, $			
Total	5692		
CI (± mean)	79 ± 5		
Surgical DRG			
Patients, *n*	68	66	
Total charges, $			
Within 2 weeks	130 554	123 721	6833 (−73 to 87)
2–6 weeks	242 254	202 629	39 625 (−169 to 248)
6–12 weeks	189 611	100 939	88 672 (−90 to 267)
Costs of nurse specialists, $			
Total	7374		
CI (± mean)	108 ± 10		

* DRG = diagnostic-related group.
† Confidence interval values are in thousands of dollars.

ers while patients were hospitalized. During the 2-week period after discharge, nurse specialists had a mean of 2.5 telephone contacts with patients and caregivers. The nurse specialists spent a mean of 3.59 hours on the discharge planning intervention while patients were hospitalized and a mean of 46.4 minutes during the 2-week period after discharge.

The total charge for nurse specialists' services for the 72 patients and 26 caregivers in the medical intervention group was $5692, whereas the total charge for the 68 patients and 48 caregivers in the surgical intervention group was $7374 (Table 5). This represents a mean charge of $93.30 for each patient and caregiver and consists of the following: the charge for the time spent by the nurse specialists in direct and indirect care while patients were hospitalized (mean, $76.80) and the time spent by the nurse specialists in telephone follow-up and indirect care during the 2-week period after discharge (mean, $16.50).

Discussion

Study findings support the need for comprehensive discharge planning designed specifically for elderly patients and implemented by gerontologic nurse specialists to improve outcomes after discharge and to achieve cost savings. The clinical intervention we tested has several advantages. It promotes continuity of care by having a nurse with specialized gerontologic knowledge and skills design and coordinate the discharge plan. In addition, the services of the nurse specialists are available to patients, their families, physicians, and other providers 7 days a week through personal visits or telephone contact while the patients are hospitalized. Telephone follow-up during the 2 weeks immediately after discharge is also provided. The need for this service can only increase as the population of hospitalized elderly patients with complex health problems continues to grow.

Elderly patients in this study exhibited increased vulnerability to poor outcomes during the first few weeks after hospital discharge. Patients in all study groups reported a substantial decline in functional status during this period. These findings reinforce the importance of follow-up after discharge to address patients' needs associated with functional decline and, in doing so, prevent the use of more costly health services.

The number of elderly patients rehospitalized in the medical control group was more than three times higher than that of the intervention group during the first 2 weeks after discharge. Six weeks after the initial hospital discharge, the readmission rate for the medical intervention group was 10%, well below nationally reported figures for comparable medical DRGs (9). These findings suggest that this clinical intervention had its greatest effect in delaying or preventing rehospitalizations during the first 6 weeks after the initial hospital discharge.

In our study, wound infections and pneumonia accounted for approximately one third of all readmissions of patients in the surgical group. Despite a substantially higher rate of verified infections reported by patients in the intervention group during the period immediately after discharge, the readmission rate for patients in the surgical intervention group 6 weeks after discharge was one fourth lower than the rate for the control group. When we controlled for differences in infection rates, the prevalence of rehospitalizations for the surgical intervention group was less than half that of the control group 2 weeks after discharge. These findings suggest that the clinical intervention may have delayed or prevented readmissions of patients in the intervention group.

Most readmissions of patients in both the intervention and control groups during the first 3 months after discharge, including those between 6 and 12 weeks after discharge, were related to the index hospitalizations.

These findings reinforce the need for strong collaboration among physicians, nurses, patients, and caregivers regarding both the patients' readiness for discharge and the plans and services necessary to prevent negative outcomes. These findings also suggest that some elderly patients may require intensive follow-up after discharge. The addition of a home care component targeted at patients who are at high risk for poor outcomes after discharge could enhance the short-term effects of this intervention and strengthen its long-term effect.

In addition to improving patient outcomes, this clinical intervention was found to be cost-effective for the medical group. Six weeks after discharge, the mean charge for all health care services for the medical intervention group was 63% less than the mean charge for the control group. The mean charge for the nurse specialists' services ($93.30) was included in the total charges for the intervention group.

The generalizability of our findings is limited because only selected medical and surgical cardiac DRGs were included in the sample. In addition, the sample included only elderly patients admitted from their homes who were alert and oriented at admission. The study was done at a major teaching hospital in an urban setting. In general, the patients in this study were well educated with good support systems; most patients had minimal functional deficits at the index hospital admission.

This study should be replicated with elderly patients admitted from various settings, including nursing homes. This protocol should also be tested with patients who have moderate to severe cognitive and functional deficits and limited support systems. Elderly patients in other DRGs admitted to small and large hospitals in various geographic areas should be included in future testing of this clinical intervention.

As the plan for a reformed health care system unfolds and elderly patients with multiple health care problems occupy a growing percentage of hospital beds, it is important for health care professionals to pursue the development of cost-effective transitional care services that facilitate discharge, that prevent poor outcomes after discharge, and that are a component of a coordinated system of care. Comprehensive discharge planning protocols developed for specific patient populations such as the elderly and implemented by nurse specialists show great promise in fulfilling these goals.

Appendix

Comprehensive Discharge Planning Protocol

The comprehensive discharge planning protocol involves both the patient and his or her caregiver. The protocol extends from hospital admission to 2 weeks after discharge. The gerontologic nurse specialist completes the following protocol for patients in the intervention group.

Initial hospital visit: The nurse specialist visits all patients and contacts all caregivers in the intervention group within 24 to 48 hours after admission to assess their discharge planning needs and expectations.

Patient assessment: Using data gathered from the patient as a base (sociodemographics, general health status, use of health and social services before hospitalization, perceived needs after discharge, functional status, mental status, self-esteem, perception of health status, and emotional status), the nurse specialist completes a thorough assessment of the patient's discharge needs within 24 to 48 hours after the patient's admission. (Note: The data needed to complete both patient and caregiver assessments are obtained from valid and reliable instruments.)

Caregiver assessment: Using data gathered from the patient's caregiver as the base (sociodemographics, perceived needs after the patient's discharge, health status, functional status, and mental status), the nurse specialist completes a thorough assessment of the caregiver's needs after discharge within 24 to 48 hours after the patient's admission.

Based on this assessment, the nurse specialist develops a preliminary discharge plan in collaboration with the patient, caregiver, physician, primary nurse, and other health care team members. A summary of the initial plan is recorded by the nurse specialist on the patient's progress notes.

Interim hospital visits: The nurse specialist visits the patients at least every 48 hours until discharge to further develop and implement the discharge plan; to collaborate with the patient's primary nurse, physician, and other health care providers in the implementation and evaluation of the discharge education plan (education based on patient-specific health problems and unique learning needs of the elderly patient and caregiver); to validate the patient's and caregiver's education; to maintain communication with all team members regarding the patient's and caregiver's progress in meeting discharge goals; to identify and respond to changes in the patient's discharge status, plans, or both; to coordinate home services; and to document in the patient's chart all progress made in these activities. As much as possible, the nurse specialist attempts to schedule these visits while the caregiver is present so that he or she will be optimally involved in preparing for the patient's discharge.

Discharge visit: Within 24 hours before discharge, the nurse specialist visits the patient and contacts the caregiver and relevant health care team members to finalize discharge preparations. Summaries of the discharge plan are recorded on the patient's progress notes; discharge summaries are also given to the patient, his or her primary physician, and other health care team members who will provide home care to the patient.

Telephone availability: The nurse specialist is available by telephone from 8:00 a.m. through 10 p.m., Monday through Friday, and from 8:00 a.m. until 12:00 p.m. on weekends throughout the patient's hospitalization, and for 2 weeks after discharge for questions or concerns from the patient, caregiver, or health care team members related to the patient's discharge plan.

Telephone outreach after discharge: The nurse specialist initiates a minimum of two telephone calls (the first within 24 to 48 hours after discharge and the second 7 to 10 days after discharge) to address any questions, to reinforce instructions, to monitor the patient's and caregiver's progress, and to modify the discharge plan when appropriate.

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