Effectiveness of a Continuum of Care Using Brief and Partial Hospitalization for Agitated Dementia Patients

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Objective: **A behavioral intensive care unit was originally designed as a 21-day inpatient program for treating agitation among demented patients, one of the most common behavioral disorders in this group. Due to the need to dramatically reduce length of stay and create alternative care environments, the original model was modified into an integrated continuum of care blending inpatient and outpatient care and partial hospitalization that reduced hospitalization from 21 to an average of seven days. This quasiexperimental study compared the effectiveness of the inpatient and continuum-of-care programs and conducted cost analyses.** ***Methods:*** **Subjects were inpatients diagnosed with both dementia and agitation. Outcomes of 68 patients treated in the inpatient program were compared with those of 110 patients treated in the continuum of care. The primary outcome measure was patients' score on the Cohen-Mansfield Agitation Inventory, which provides a total agitation score and scores on three factors describing agitated behavior—physically aggressive behavior, verbally aggressive behavior, and nonaggressive behavior.** ***Results:*** **A statistically significant reduction in agitation was found for patients treated in both programs, with no significant difference in outcome between programs. Patients in both programs showed significant improvements in physical aggression, verbal aggression, and nonaggressive behavior. The cost-effectiveness analysis revealed clear advantages for the continuum-of-care program, especially in the area of aggressive behaviors.** ***Conclusions:*** **The data suggest that the restructured program is an effective and economically feasible intervention. (*Psychiatric Services* 48:1435–1439, 1997)**

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Agitation is one of the most prevalent behavioral problems observed among demented patients. More than 60 percent of demented patients develop agitation at some point, dramatically increasing the risk for institutional placement and the burden on family caregivers (1). Agitation is defined as "inappropriate behavior unrelated to unmet needs or confusion" (2). Symptoms of agitation include wandering, hitting, kicking, grabbing, screaming, intentional falling, performing repetitious acts, or causing injury to self or others.

Multiple medical and psychiatric disorders can cause reversible agitation (3). However, a group of demented patients present with a type of agitation that is not secondary to other medical or psychiatric disorders but is a symptom of the dementia disorder itself. The clinical treatment of this type of agitation is extremely difficult and often requires hospitalization (3).

A behavioral intensive care unit, originally designed as a 21-day inpatient program for agitated demented patients, was established in 1992 at the Institute of Psychiatry, part of the Medical University of South Carolina's acute care hospital in Charleston (4). Briefly, the original program included a specific algorithm of care comprising three basic elements, each addressed

in a one-week treatment period (4). The program was redesigned as a continuum of care in 1993, which blended brief inpatient care and partial hospitalization. The restructured program maintains all elements of the original model while reducing inpatient stay to an average of seven days.

The study reported here used a quasiexperimental approach to compare the outcome of patients treated under these two differently structured programs. In addition, a comparative cost analysis was conducted.

Basic elements of the model

Identification of target behaviors

Each patient receives an initial evaluation. Information is recorded about sleep patterns, appetite and dietary intake, diurnal variation of the agitation, psychomotor agitation or retardation, quality and quantity of interactions with others, energy levels, intensity of somatic complaints such as constipation or pain, presence of hallucinatory or paranoid behavior, ability to independently carry on activities of daily living, confusion, memory loss and disorientation, repetitive behavior, and circumstances leading to catastrophic reactions such as aggressive behavior. These observations are recorded along with information provided by the patient's caregiver and primary care provider. The goal of this assessment is to rule out undiagnosed medical or psychiatric disorders and establish the basic pattern of behavioral disturbances.

Evaluation and intervention design

When the patient is admitted to the unit, medical and psychiatric assessments are conducted during a two-day observation period, followed by an investigation of the factors contributing to the agitated behavior. These factors may be related to the patient's psychiatric, medical, or neurological condition, or they may be environmental factors such as an inappropriate level of stimulation, excessive confinement, or activity not appropriate to the patient's functional abilities.

To identify factors related to agitation, specially designed tools are used (4). For example, all patients are exposed to three gradually increasing levels of environmental stimulation and demand associated with daily living activities, contact with caregivers, and social activities. The patient is initially observed performing these activities, with minimal verbal contact and cuing from the observers. Meals are served in the patient's room, and all patients are fed by a staff member. If no agitated behavior is observed, patients are gradually allowed to participate in their care. However, they are not told that they are expected to participate. If agitation is not present during the observation period, patients are allowed to feed themselves, and staff increase their verbal interaction with patients.

If agitated behavior is still not observed, patients are informed that they are expected to participate in daily activities, eat independently in the common areas, and interact with other patients and staff. When agitated behavior is observed, stimulation is reduced to the previous level.

Information about patients' behavior is recorded through formal evaluations and observations at scheduled intervals, sometimes as frequently as once every half-hour. Information obtained during the previous 24 hours is reviewed by a multidisciplinary team consisting of an attending physician or psychiatrist, a resident, a neurology consultant, a psychologist, a clinical pharmacist, a social worker, a clinical nurse specialist, and a dietician. After the staff review, activities to be performed that day are coordinated.

An individualized treatment plan is designed for each patient, with the goal of establishing an optimal level of functioning. The patient and caregivers are included whenever possible in formulating the treatment plan, with the expectation that the patient will return home.

Treatment implementation

Nursing staff are encouraged to supplement management strategies based on their direct observations of the patient's response. Any new procedures are documented and incorporated into the treatment plan. In addition to the behavioral interventions, specific pharmacological algorithms, which have been described elsewhere (5,6), are used when indicated.

An occupational therapist visits the patient's home toward the end of treatment and provides specific recommendations for making the home "patient safe" or "patient proof." Staff from all disciplines provide training for caregivers, and at a family discharge conference the caregiver is given information on the patient's diagnoses and the therapeutic procedures carried out during treatment.

An alternative model

Early evaluation of the original 21-day inpatient model indicated that it was effective (4). However, the emotional cost was high, and the model was not financially viable. Under the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982, Medicare reimbursement for psychiatric beds is limited to a target amount per Medicare discharge, and the payment covered only the cost for an eight-day inpatient stay, necessitating alternative and less costly treatment strategies.

A multidisciplinary group of clinicians and medical administrators proposed an alternative treatment model that preserved the components of the original model but provided treatment in a less restricted environment, if possible. The final model is a continuum of care. This term is used because the model employs a single plan for treatment delivered in three different settings. Some components of the inpatient program were shifted to outpatient and partial hospitalization settings in which services are reimbursable under mechanisms other than TEFRA. The program costs are spread over three different revenue streams—in-home assessment and inpatient and partial hospitalization.

Target behaviors are identified and evaluated in the patient's home by a specialized clinician in collaboration with the patient's primary physician before the patient is admitted to the inpatient unit. In the inpatient setting, agitated behaviors are evaluated, and an intervention strategy is developed, during an average length of stay of one week. Treatment is implemented in a specialized day program.

Methods

The goal of this study was to assess and compare the clinical efficacy and cost efficacy of two models of care—

Table 1

Mean pre- and posttreatment scores on the Cohen-Mansfield Agitation Inventory (CMAI) of agitated demented patients treated in two programs, a 21-day inpatient program and a program of brief inpatient evaluation followed by partial hospitalization (continuum of care)

	21-day inpatient program (N=68)				Continuum of care (N=110)			
	Pretreatment		Posttreatment		Pretreatment		Posttreatment	
Measure	Mean	SD	Mean	SD	Mean	SD	Mean	SD
CMAI total score	16.7	16.3	9.2	11.9**	13.8	14.02	8.4	11.8*
CMAI factors								
Physical aggression	8.8	9.8	5.3	7.8*	6.3	7.4	4.3	7.2*
Verbal aggression	5.0	6.7	2.9	6.2*	4.8	6.0	3.3	6.9*
Nonaggressive behavior	3.0	6.8	1.0	2.3**	2.7	6.9	0.7	1.9*

*p<.01, for within-group difference
**p<.001, for within-group difference

the 21-day inpatient program and the continuum-of-care program—for demented agitated patients.

Subjects

Subjects were consecutive admissions to the behavioral intensive care unit during the last six months of 1992, when the 21-day model was in effect, and the last six months of 1993, when the continuum-of-care model was used. All subjects lived at home before admission to the program. All were diagnosed as having dementia based on *DSM-III-R* criteria (7). The patients met criteria for agitation described by Cohen-Mansfield and Billig (2). On admission to the program and during the evaluation period, demographic information was obtained, and all patients were administered the Mini Mental State Examination (MMSE) (8) and the Blessed Dementia Scale (BDS) (9).

Of the 68 participants enrolled in the 21-day program, 26 (38 percent) were men, and 42 (62 percent) were women. Fifty-one (75 percent) were Caucasian, 16 (24 percent) were African American, and one (2 percent) was from another ethnic background. The mean±SD age of this group was 78.44±6.7 years. Thirty-seven patients (54 percent) were married and were cared for by a spouse. Thirty-one (46 percent) were single, widowed, or divorced and were cared for by an adult child, another relative, or a paid companion.

A total of 112 subjects were from the continuum-of-care program; 40 were men (36 percent) and 72 were women (64 percent). Eighty-six patients (77 percent) were Caucasian, 24 (21 percent) were African American, and two (2 percent) were from other ethnic backgrounds. The mean±SD age of this group was 78.1±7.2 years. Fifty-two patients (46 percent) were married and were cared for by a spouse. Fifty-four (48 percent) were single, widowed, or divorced and were cared for by an adult child, another relative, or a paid companion.

The mean±SD rating on the MMSE was 11.8±7.38 for the continuum-of-care group and 12.7±7.48 for the 21-day inpatient group. Possible scores on the MMSE range from 0 to 30, with higher scores indicating a higher level of cognitive performance.

Measures

The Cohen-Mansfield Agitation Inventory (CMAI) (2), a 7-point rating scale, was used to measure agitated behavior. The CMAI assesses the frequency of pacing or aimless wandering; inappropriate dressing or disrobing; spitting; cursing or verbal aggression; constant unwarranted requests for attention or help, or repetitive questions or sentences; hitting or kicking; throwing things; making strange noises or screaming; biting; trying to get to a different place; complaining or being negative; hurting self or others; and general restlessness.

A factor-analytic study of the CMAI (2) revealed three reliable factors corresponding to physically aggressive agitated behavior, verbally aggressive agitated behavior, and nonaggressive agitated behavior. For this study the scoring system of the CMAI was modified, with 0 indicating no agitation, and a score of 4 or higher indicating clinically significant agitation for every factor. Interrater reliability for the CMAI is high (average Cronbach's alpha=.92) (10).

Procedure

Clinical outcome analysis. During the evaluation, the patient underwent a standard workup; baseline measures were recorded. Baseline measures were obtained by a registered nurse, who rated the patient's agitated behaviors on the CMAI based on information about the week before evaluation. Outcome information was obtained by re-rating the patient using the CMAI during the week immediately after discharge from either of the programs.

Chi square tests and t tests were used to evaluate differences in demographic variables. The t test was used to compare pre- and posttreatment differences in CMAI scores. Correlational analyses were conducted to assess the association of demographic variables (age, gender, race, and marital status), length of hospitalization, and scores on the pretreatment measures (MMSE and BDS) with the change in agitated behavior from admission to discharge (the difference in the CMAI pre- and posttreatment scores).

Cost-effectiveness analysis. Cost-effectiveness analyses are used to evaluate how efficiently different programs achieve a specific set of results using common outcome measures (11). Although these analyses are limited by the fact that no single unit of

Table 2

Program expenditures and cost-effectiveness analysis of two programs to treat agitated demented patients, a 21-day inpatient program and a continuum of care[1]

Cost feature	21-day inpatient program (N=68)		Continuum of care (N=110)[2]		Test statistic	df	p
	Mean	SD	Mean	SD			
Mean total cost	$18,558	$5,830	$9,600	$3,507	t=12.74		<.001
Mean total cost by gender					F=54.06	3,172	<.001
Female	18,819	5,807	9,843	3,976			
Male	18,100	5,967	9,175	2,474			
Mean total cost by ethnic group					F=40.59	4,171	<.001
Caucasian	18,661	6,338	9,862	3,828			
African American	18,350	4,298	8,663	1,721			
Change in total score on the Cohen-Mansfield Agitation Inventory (CMAI) per $1,000	0.27	0.84	0.89	0.22	t=2.20		.03
Change in physically aggressive CMAI factor score per $1,000	0.07	0.47	0.43	0.13	t=2.13		.03
Change in verbally aggressive CMAI factor score per $1,000	0.09	0.44	0.22	1.00	t=1.04		ns
Change in physically nonaggressive CMAI factor score per $1,000	0.12	0.39	0.25	0.74	t=1.26		ns

[1] The unit of measure is the change in scores between baseline and the end of treatment on the CMAI and its three factors.
[2] Data for two continuum-of-care patients in the "other" ethnic group category were omitted from these analyses.

measure can satisfactorily describe the outcome of a particular intervention, they can provide insight into how effectively health care dollars are spent. As the behavioral intensive care unit evolved from an inpatient program to one that blended inpatient care and partial hospitalization, cost-effectiveness analysis provided a complementary approach to examining program effectiveness.

Typically, data from cost-effectiveness analyses have been presented as units of change per fixed dollar spent (11). To measure cost-effectiveness in this study, the difference in pre- and posttreatment CMAI scores was used. As previously described, the total CMAI score can be broken down into three factors: physically aggressive agitated behavior, verbally aggressive agitated behavior, and agitated behavior that is not aggressive. Estimates were based on a cost of $800 a day for inpatient hospitalization on the unit and $250 a day for partial hospitalization. Costs for the inpatient program were calculated by multiplying the number of days of inpatient care by the daily cost of $800.

The continuum-of-care program included an average of seven days on the inpatient service followed by partial hospitalization. Costs for this program were calculated using the following formula: (7 days × $800) + ([length of stay–7] × $250). For each patient who completed the program, the following calculations were made: the change in the total CMAI score per $1,000 expenditure; the change in the CMAI score for physically aggressive agitated behavior per $1,000 expenditure; the change in the CMAI score for nonaggressive agitated behavior per $1,000 expenditure; and the change in the CMAI score for verbally aggressive agitated behavior per $1,000 expenditure.

Student's t test was used to examine differences between the two treatment groups in changes in CMAI scores per $1,000 expenditure.

Results

Clinical outcomes

No significant differences between the 21-day inpatient group and the continuum-of-care group were found in age, racial composition, gender, or marital status. Table 1 presents the mean total scores and factor scores on the CMAI for both groups at pre- and posttreatment. Analysis of the scores using the t test for paired samples showed a statistically significant reduction in agitation for both groups. Statistically significant changes on each of the CMAI factor scales were also observed for both groups. Analyses by t test of change in agitated behavior from admission to discharge from the program—the difference between the CMAI pretreatment and posttreatment scores—revealed no significant differences between groups in either total scores or factor scores.

Agitated behavior decreased by at least 30 percent for 74 patients in the continuum-of-care group (66 percent) and 33 in the inpatient group (49 percent). Complete resolution of agitated behavior was reported for 16 subjects in the inpatient group (24 percent) and 22 in the continuum-of-care group (20 percent).

No significant correlations were found between subjects' demographic characteristics and change in CMAI scores at discharge from the program.

Cost-effectiveness analysis

As shown in Table 2, the cost of the continuum-of-care program—$9,600 per patient—was significantly less than the cost of the inpatient program—$18,558. As anticipated, no differences in total expenditures were found in either treatment group between men and women or between persons of different ethnic backgrounds.

Table 2 also summarizes the cost-effectiveness analyses and shows that the continuum-of-care program was significantly more cost-effective than the inpatient program, with a nearly threefold difference in CMAI total score per $1,000 of expenditure.

Analyses of the three CMAI factors found that the most cost-effective outcome for the continuum-of-care model was a reduction in physical aggression, which showed a sixfold improvement over the inpatient model. No significant difference was found for verbally aggressive agitated behavior or nonaggressive agitated behavior.

Discussion and conclusions

Dementia is a significant problem that drains economic resources, especially when patients require nursing home placement. In addition, the quality of life and mental health of caregivers are often compromised. This study examined outcomes of two different approaches to the care of demented agitated patients. The programs are similar in philosophy and method, but the treatment settings differ.

Changes in pre- and posttreatment CMAI scores of patients in the two programs indicated that the transition from an inpatient program to a blended inpatient–partial hospitalization program did not compromise treatment efficacy. The scores showed that agitation was significantly reduced in both groups. No significant differences in outcome were observed between the programs. The cost-effectiveness analysis also added justification for the transition to a continuum-of-care program.

Several comments about these analyses can be made. First, we expected to find between-group differences for program expenditures. Obviously, services provided in a nonhospital setting would be expected to cost less. However, equally important were the findings from the within-group analyses that costs did not differ by gender and ethnicity. The findings suggest that these demographic characteristics are not particularly relevant to decisions about patient enrollment or treatment setting. Gender and ethnicity variables are often used as proxies for more subtle socioenvironmental factors, such as the integrity of a patient's social network, that may directly influence the efficacy of outpatient care of these patients. If differences were found—for example, if costs were higher for women than for men in either program—then it would be reasonable to weigh these factors differently when making enrollment decisions.

The cost-effectiveness data revealed that the continuum-of-care program had the most robust impact on physically aggressive behavior, thus challenging the conventional wisdom that physically agitated dementia patients can be handled only in inpatient settings. The sixfold difference in cost-effectiveness indicates that the additional $9,000 per patient for inpatient services was money not well spent.

Unfortunately, Medicare A and B and state Medicaid regulations currently limit delivery of community services, such as respite or day care. We know that day care, respite care, and partial hospitalization programs for agitated demented patients are effective and are less costly than institutional care (3,12). We believe that a restructuring of reimbursement and purchasing policy at federal and state levels is needed to facilitate program development by community providers.

A number of caveats can be raised about these data. First, changes in the program were made in response to external forces and were not the result of a tightly controlled health services experiment. At best, this report summarizes the results from a naturalistic or quasiexperimental design. Fortunately, the therapeutic intervention for agitation was the same in both programs; hence additional sources of variance were relatively stable.

Because the study was not a randomized controlled trial, the possibility of systematic bias in our sample cannot be excluded. For example, patients' social networks that allowed those in the continuum-of-care program to be successfully managed in a less restrictive environment were not examined. Demographic analyses, however, failed to find any significant differences between the patients treated in the two programs; thus the findings appear to have merit and may be generalizable.

Second, because agitation tends to wax and wane in dementia patients, a true control group of patients was not part of the study design. For example, patients in routine care or on waiting lists for care could constitute a control group. We cannot estimate the effect size of the interventions in this study, nor the effectiveness of these interventions across different care settings. We acknowledge that further examinations at the margins need to be done. For example, incremental costs for eight, ten, 12, or 18 days could be calculated. Although a health services randomized controlled study is difficult to implement, it may provide critical outcome data about the efficacy of the treatment principles outlined in the model used in the behavioral intensive care unit.

In summary, our data suggest that if the basic elements of a clinical program are preserved, successful outcome can be achieved without expensive and extended hospitalization. ♦

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