An Evaluation of Case Management

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Abtract: This project explores the efficiency and effectiveness of case management as compared with the usual and customary services available to chronic mentally ill individuals in reducing readmissions to mental hospitals and improving the quality of life. A randomized pretest-posttest control group design was used to assign 417 individuals who had at least two discharges from a mental hospital to an experimental (E) group (N = 213) to receive case management services and a control (C) group (N = 204) who could receive any services but case management. After participation in the project for 12 months, 138 members of the E group and 126 members of the C group were reinterviewed. The E group received more services, cost more to maintain, and were admitted to mental hospitals more often, but concomitant improvement in quality of life indicators was not evident. Alternative explanations for the findings are discussed. (*Am J Public Health* 1987; 77:674–678.)

Introduction

Case management is being developed as an essential part of local mental health service delivery systems throughout the nation. The concept is intuitively appealing as a system to reduce inappropriate use of state mental hospitals, to improve continuity of care by linking the client with needed services, and to improve the client's quality of life in the community. Case management varies in form and function according to the system within which it is developed but the central theme of case management is that responsibility for meeting the needs of the client is with one individual or team whose purpose is to link the client with services required for a successful outcome. Philosophies, definitions, models, functions, purposes, and specific objectives of case management are presented elsewhere[1–3] and will not be discussed in detail here.

Although the case management concept is widely accepted, evidence of its effectiveness and its cost when compared with the usual and customary services provided by the community mental health center are not available. The purpose of this paper is to explore the effectiveness and cost of the generalist[1] model of case management in reducing admissions to mental hospitals and in improving the quality of life of community-based mentally ill individuals who have had two or more admissions to state hospitals, county hospitals, or both.

The research question is: as compared with the services that are already provided in the community, does case management reduce admissions, increase the utilization of community-based services, affect the cost, and improve the quality of life of chronic mental patients who live in the community?

Methods

The study is a pretest-posttest control group design in which simple random sampling was used to create an experimental (E) group and a control (C) group from a population of adults who had been admitted two or more times to state and/or county mental hospitals between September 1, 1981 and November 30, 1983 and who were living within the catchment area of a community mental health center in January 1984, but not in a nursing home, jail, or psychiatric inpatient facility.

The Community Mental Health Center developed a case management program for this project and continued to operate the program after the research was completed. The case management unit included a supervisor and seven case managers with undergraduate or graduate degrees in social work, sociology, psychology, counseling, or business administration and an average of 4.3 years (range 10 months to nine years) of experience with mentally ill persons. During the project, they spent an average of 51 per cent of their time delivering nonclinical services directly to clients, 39 per cent brokering services, and 10 per cent in other activities such as travel, public relations, documentation of activities, and training. The case management supervisor reported through the mental health director to the executive director of the Community Mental Health Center.

Identifying the population from which to draw the sample was tedious. Lists with approximately 630 names were prepared from records of the State Department of Mental Health and Mental Retardation, a county hospital, and the community center. Duplicates from misspelling, use of initials instead of first name, interchange of first and middle names, and recording errors were removed from the list. Known residents of nursing homes, jails, and psychiatric inpatient facilities within the catchment area were also removed from the list, as were individuals who were in state hospitals outside the center's catchment area. By the end of this process, the list contained names of 500 individuals who were potentially eligible to participate in the study if they were living within the center's catchment area. Using a computer-generated table of random numbers, we created two groups and randomly selected one group to receive case management.

We hired and trained graduate students from a local university and center staff as interviewers, and hired a field supervisor to assist in the location of study participants. We planned to interview approximately 440 subjects, ideally 220 subjects from each group, but we soon found that we had underestimated the difficulty of finding members of this population. By the end of the time and money allocated to this phase of the project, we had located and interviewed 417 subjects.

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The E group had been divided into units of approximately 30 persons based on the zip code of the subject's residence; case managers had been assigned to each group. Some minor adjustments were made, e.g., spouses who were split between the E and C groups were reassigned to the same group; some of the subjects were reassigned among case managers because they had changed residences. By the end of this process, 213 individuals were in the E group and 204 in the C group.

We monitored readmissions to state mental hospitals and the county hospital, and gathered data concerning utilization of resources from clients each time they visited the community center from January 1984 through July 1985. Resources were defined broadly to include any contact in which the client received care, treatment, or assistance of any kind during the week preceding a visit to the center. By modifying an existing patient data reporting system, data concerning the use of resources were collected from all clients of the community center so that center staff would not know which clients were participating in the research project.

The model of quality of life developed for this project expands the two-part model of objective indicators of life situations and subjective measures of satisfaction with these situations by adding measures of adaptation to life situations. The three-part model (Figure 1) has been suggested by others[4–7] and described elsewhere[8] in detail.

The domains of life situations in the model are based on the needs of chronic mental patients in the community that could be influenced by case management. There are objective measures of type of housing, living arrangements, social relations, leisure activities, individual monthly income, and employment status. The subjective element includes measures of satisfaction with each of the six objective areas. The measures of adaptation to life situations are: performance of activities of daily living, affect balance,[9] and self-esteem.[10]

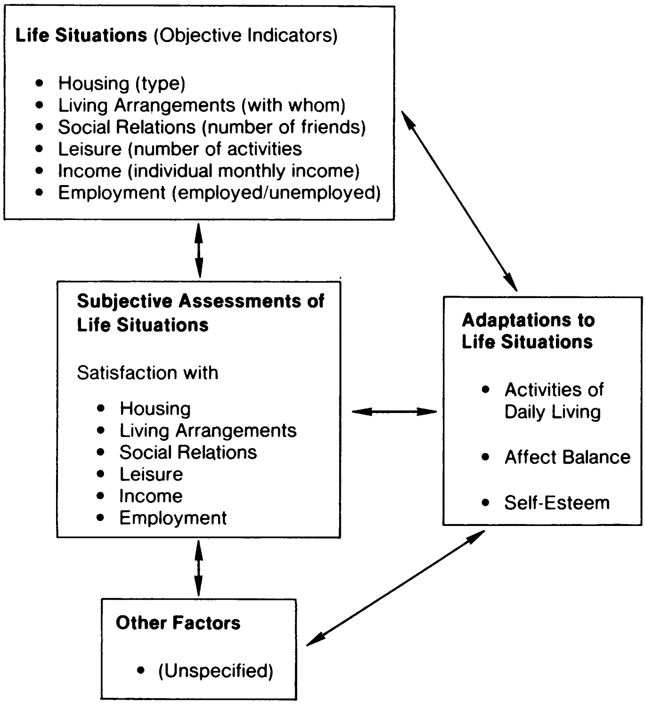

FIGURE 1—Quality of Life

Activities of daily living are measured by a six-item scale that includes self-assessments of how well the subject performed such activities such as housework, cooking, shopping, budgeting, and traveling around town. The affect balance scale is a short-term (in the past month) assessment of positive and negative feelings expressed by 10 statements to which the subject answers "yes" or "no". The five-item positive affect subscale has been associated with positive mental health while the negative affect subscale has been correlated with poor mental health or mental illness.[11] The self-esteem scale consists of five statements such as "on the whole, I am satisfied with myself" and "I feel useless at times."

Results

At the end of 12 months we could not find 76 (18 per cent) of the 417 subjects who were interviewed at the beginning of the study; 31 (9 per cent) of the subjects we located refused a second interview. We accounted for but did not interview an additional 45 subjects, and we discarded one subject's interview. Reasons for not interviewing the 45 subjects a second time were: four were in jail, 13 were in a state hospital, two were in a county hospital, three were in a Veterans Administration hospital, four had died, 17 had moved out of the center's catchment area, and two subjects were considered too dangerous to interview.

Thus we accounted for 82 per cent of the original sample 12 months after the first interview and interviewed 64 per cent of the original sample.

There were no differences of consequence between the proportion of E and C groups interviewed, or between those actually interviewed once or twice in relation to age, sex, ethnicity, marital status, employment status, primary diagnosis at last discharge, and quality of life pretest scores (Table 1). Both groups averaged less than four prior admissions to state mental hospitals between September 1981 and November 30, 1983. Of those we accounted for but did not interview twice, the four deaths were from the C group; three of the four subjects who were in jail, and 11 of the 17 subjects who had moved were from the original E group. These data are difficult to interpret, however, since we did not account for 76 subjects from the original sample.

In the 12 months following their first interview, 62 members of the E group and 38 members of the C group were readmitted to state and/or county hospitals. In Table 2, admission and discharge records of state and county hospitals show that twice as many members of the E group were admitted to state mental hospitals and they stayed longer on the average than controls. More members of the E group than the C group were admitted to county hospitals; their average length of stay was similar to that of the controls. The E groups used 3,173 bed days in state and county hospitals, almost twice the 1,671 bed days used by the C group, at an average cost per subject of $7,120 as compared with $6,249 average cost per control subject.

The E group used 12,982 community-based services, 2.35 times the 5,515 services used by the C group during the year between their first and second interviews (Table 3). Ninety-six per cent of the services used by the E group and 95 per cent of the services used by the C group were provided by the community center.

The two groups differed little in their use of medication management services, suggesting that these services were available and accessible to members of both groups. There were major differences between the two groups in use of

TABLE 1—Characteristics of Experimental (E) and Control (C) Groups Interviewed Once and Twice

Characteristics	Total	E Group	C Group
Sex			
Male	205(127)	102(70)	103(57)
Female	212(137)	111(68)	101(69)
Ethnicity			
White	298(192)	154(99)	144(93)
Hispanic	16(7)	4(3)	12(4)
Black	102(64)	54(35)	48(29)
Other	1(0)	1(0)	0(0)
Marital Status			
Married	72(32)	33(17)	39(15)
Divorced/Separated	154(64)	80(33)	74(31)
Widowed	20(6)	9(3)	11(3)
Never Married	171(86)	91(50)	80(36)
Employment			
Fulltime (>35 hours week)	68(40)	31(18)	37(22)
Parttime (<35 hours week)	44(37)	20(17)	24(20)
Not Regular	15(10)	9(6)	6(4)
Not Employed	290(173)	153(95)	137(78)
Diagnoses (DSM III)			
Schizophrenia	232(151)	124(83)	108(68)
Affective Disorder	73(44)	34(21)	39(23)
Substance Abuse	41(24)	15(8)	26(16)
All other	56(36)	32(21)	24(15)
Undiagnosed	15(9)	8(5)	7(4)
Age (years)			
0–30	143(81)	81(46)	62(35)
31–40	115(72)	52(37)	63(35)
41–50	75(51)	35(22)	40(29)
51–60	66(43)	39(27)	27(16)
61–+	18(17)	6(6)	12(11)
Pretest Scores (X/SE)			
ADL Pretest Only	2.84/.079	2.88/.118	2.80/.108
ADL Pre & Posttest	2.54/.056	2.60/.074	2.48/.085
SE Pretest Only	3.42/.057	3.41/.085	3.43/.077
SE Pre & Posttest	3.42/.043	3.39/.057	3.46/.065
PWB Pretest Only	14.68/.198	14.68/.293	14.69/2.69
PWB Pre & Posttest	14.89/.138	14.67/.186	15.12/2.04

NOTE: Statistics of subjects who were interviewed twice are in parentheses. X/SE is the mean and standard error of the mean.

TABLE 2—State and County Hospital Admissions and Costs of Experimental and Control Groups

Hospital Admissions	N	Total Bed Days	Average Days per Subject	Estimated Total Cost	Estimated Cost per Subject
E Group					
State	20	2,370	118.5	$304,924*	$15,246*
County	42	803	19.1	136,510**	3,250**
Total	62	3,173	51.2	441,434	7,120
C Group					
State	10	1,127	112.7	$145,000*	$14,500*
County	28	544	19.4	92,480**	3,303**
Total	38	1,671	44.0	237,480	6,249

*State hospital cost is $128.66 per day, the average of the cost per day in three state hospitals used by patients from this catchment area.

**County hospital cost is $170.00 per day. Both estimates are conservative and should be used for comparison purposes only.

TABLE 3—Average Number of Services, by Experimental and Control Group Members Who Were Interviewed Twice

	Experimental		Control		Total
Services	N	Per Person	N	Per Person	N
Assessment/ Evaluation	388	2.8	174	1.4	562
Criminal	50	.4	44	.3	94
Emergency Room	35	.3	7	.1	42
Inpatient	21	.2	8	.1	29
Medication Management	2,180	15.7	1,878	14.9	4,058
Medical	184	1.3	161	1.3	345
Other	5,403	39.2	1,529	12.1	6,932
Short-term therapy	1,498	10.9	337	2.7	1,835
Social/ Economic	3,223	23.4	1,377	10.9	4,600
Totals	12,982	94.1	5,515	43.8	18,497

TABLE 4—Difference Between Pretest and Posttest Results of Quality of Life in Experimental and Control Groups*

Quality of Life Variables	E Group	C Group
Home: Dissatisfied	−2%	0%
Private	(0)	(+2)
Non-supported	(−10)	(+3)
Other	(+9)	(−5)
Living Arrangements: Dissatisfied	−4%	+3%
Non-related	(+1)	(+2)
Alone	(+2)	(+3)
Related	(+1)	(+3)
Number of Friends: Dissatisfied	−1%	−2%
3 or more	(+8)	(+10)
1 or 2	(−17)	(−12)
none	(+5)	(+5)
Total Monthly Income: Inadequate	+1%	+9%
none	(−13)	(+2)
$1–400	(+1)	(−10)
$401–800	(+5)	(−3)
$801–1200	(+3)	(+1)
$1201–+	(+5)	(+9)
Employment Status	—	—
Fulltime (>35 hours week)	+6%	−3%
Parttime (<35 hours week)	−3%	−7%
Irregular	+3%	0%
Not employed	−7%	+10%
Leisure: Dissatisfied	−4%	−7%
No participation	(+6)	(+3)

*See text for explanation of table.

social/economic services, short-term therapy, inpatient services, assessment/evaluation, emergency room, and "other" services. Services labeled "other" included treatment planning, case consultation and documentation of the treatment process, referrals, use of telephone on behalf of clients, hospital contacts, screening, and activities related to intakes and discharges.

The subjective and objective measures of quality of life are contained in Table 4 where the cells indicate the changes in the 12 months between interviews. For example, at the beginning of the project, 21.5 per cent of the E group and 18.6 per cent of the C group were dissatisfied with their homes. One year later, 19.3 per cent of the E group was dissatisfied (a decrease of 2 per cent); there was no change for the C group. Subjective measures of work satisfaction were not included in the analysis because 70 per cent of the E group and 63 per cent of the C group were not employed at the beginning of the project.

The objective measures are interpreted in the same way: at the beginning of the project, 68 per cent of E group and 69 per cent of C group lived in private homes; 18 per cent of E

TABLE 5—Differences in Mean Pretest and Posttest Scores on Three Measures of Adaptation, Experimental and Control Groups

Measures of Adaptation	Number	Mean	Standard Deviation
Activities of Daily Living*			
Experimental	136	−.0240	1.00
Control	125	−.0025	.91
Self-esteem			
Experimental	138	.0624	.70
Control	124	.0258	.69
Psychological Well-being			
Experimental	138	.5400	2.762
Control	124	.0302	2.689

*Coded such that more negative the score the more favorable the result.

group and 17 per cent of C group lived in non-supported homes; 15 per cent of each group lived in other homes. Twelve months later, 68 per cent of E group and 71 per cent of C group lived in private homes, showing no change for E group but a 2 per cent increase for C group. Eight per cent of the E group and 20 per cent of C group lived in non-supported homes, a −10 per cent change for E group and +3 per cent change for C group. Twenty-four per cent of the E group and 10 per cent of the C group now lived in other homes; a change of +9 per cent and −5 per cent, respectively. Changes in percentages in Table 4 do not always equal out due to rounding and, for Living Arrangements and Number of Friends, missing data on the pretest that were available on the posttest. Only small and insignificant changes in objective measures were experienced by both the E and C groups but the gains of the E group in total monthly income and improvements in employment status should be noted.

In the adaptation component of quality of life (Table 5), both the E and C groups had small gains in the year between the first and second interview, but they did not differ much at the end of the project. The E group gained slightly more in activities of daily living, self-esteem, and psychological well-being but the differences in mean gain scores and the relatively large standard deviations (SD) indicate the lack of important differences between the two groups. To check the possibility that differential gains within mental illness categories may have obscured group gains, we repeated this analysis within diagnostic categories of the E and C groups but again found no differences of consequence in adaptation scores.

Discussion

As compared with the usual and customary services that were provided in the community, case management appears to have increased utilization of hospitals and community-based services hence the cost of serving the community-based mentally ill; at the same time case management did not have any substantial or important effect on the quality of life of individuals who have been discharged at least twice from a state or county mental hospital. Some slight gains in employment status and total monthly income were associated with case management.

The findings concerning costs and services were anticipated by at least one author who suggested that while in theory case management might reduce costs by linking clients and services appropriately, thereby decreasing the number of wasted services and improving the efficiency of the service delivery system overall, in practice case management clients receive more services and cost more per client.[2] Indeed, one of the key elements of case management is that it provides clients "what they need, when they need it and when they want it, for as long as necessary."[1]

The lack of substantial improvement in quality of life associated with increased use of services could be due to the relatively short time (12 months) between measures of Quality of Life. Our sample included individuals who were severely ill as indicated by at least two discharges from a mental hospital, and such individuals may not improve much even with effective and aggressive services over a long time.[12,13] The statistics in Tables 4 and 5 do favor the E group and, although they do not exceed the levels of the C group to any important extent, perhaps a longer interval between Quality of Life measures would have shown more substantial differences between the two groups. One can only speculate as to whether the gains in adaptation, employment, and total monthly income, if continued over enough time, could justify the increased costs of case management. Unfortunately, efforts to fund an extension of the project were unsuccessful.

Case management cannot be divorced from its setting and, in the long run, its effectiveness may well be tied to resource availability; a potential alternative explanation for the findings is that adequate resources were already available to both the E and C groups so that there was no need to add case managers. Some support for this notion is the very little difference between the E and C groups in their use of medication and medical services. Also, the research was carried out within a catchment area of a community mental health center that had an aggressive aftercare program and the center is considered to be well-managed and staffed with qualified and motivated individuals.

Although we used a research design that controls for threats to internal validity, many of the differences in Table 1 seem to favor the C group. For example, the E group contains more males, more Blacks, more never married, fewer initially employed, and perhaps fewer individuals who are potentially able to improve on the Quality of Life measures as suggested by diagnoses and younger age. However, the E and C group differences as well as differences in Quality of Life scores between diagnostic categories are relatively slight.

Case management is uniformly favored as a method to maximize the effectiveness of existing services, given the realities of cost shifting from federal to state to local governments and cost containment of services for the mentally ill. It is mandated by legislative action in some states and by administrative order in others. Our findings that case management is effective in linking clients with services but at higher cost and without apparent concomitant gains in quality of life should be interpreted cautiously for the reasons discussed above. Further research is needed to validate these findings.

Nevertheless, our findings indicate the need to examine case management carefully, in order to identify more precisely clients who benefit from increased services. Simply tallying the volume of services provided is an inadequate measure of the effectiveness of programs for the mentally ill. More attention needs to be given to the prudent purchase of needed services in the community in the interests of cost containment. Short- and long-range objectives that are based on client outcomes as well as criteria to assess the need for case management services within a catchment area need to be developed.

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A. A. Afifi, PhD, Named Dean of UCLA School of Public Health

Abdelmonem A. Afifi, MS, PhD, was named dean of the UCLA School of Public Health, effective April 1. He has served as acting dean of the school since November 1985, when the previous dean, Dr. Roger Detels, returned to teaching full time.

Dr. Afifi has been on the faculty of the UCLA School of Public Health since 1965, when he joined the school as assistant professor of biostatistics. In 1971, he was named associate professor and, in 1975, became professor and head of the division of biostatistics. He is also professor of biomathematics at the UCLA School of Medicine. A distinguished scholar and public health professional, Dr. Afifi has been the recipient of a Fulbright Grant (1960), the Mortimer Spiegelman Gold Medal Award from the American Public Heath Association (1976), and was named a fellow of the American Statistical Association (1978). His research interests include the statistical analysis of health risk factors, the effects of moderate malnutrition, and multivariate statistical analysis. Among his published works are articles or book chapters on such subjects as risk factors for lung disease, the epidemiology of transfusion-caused hepatitis, and health and economic factors affecting mortality.

Dr. Afifi has served as consultant to many organizations in the United States and worldwide, including the City of Hope; Boltzmann Institute in Vienna, Austria; the Los Angeles County Assessor's Office; the Rand Corporation; and Ministry of Health in Egypt. Prior to joining the UCLA School of Public Health faculty, Dr. Afifi was a visiting assistant professor in the Department of Statistics at the University of Wisconsin at Madison. He received a PhD in statistics from UC Berkeley in 1965, an MS degree in statistics from the University of Chicago in 1962, and a BSc degree in mathematics from Cairo University in 1959.