



Transforming mental health services through collaboration: Costs and outcomes

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Abstract

Background: This study examines general service costs and utilization and changes in mental health symptoms and outcomes for 269 individuals who received public mental health services in a suburban/rural county. Sub-analyses were completed for a subset of 104 individuals for costs and outcomes; outcomes included service utilization, cost, and housing in a community mental health treatment system.

Aims: The aim of this study was to determine if study participation: increased community mental health service utilization and costs; decreased inpatient behavioral health service utilization and costs; and reduced mental health symptoms and increased functioning.

Methods: An observational design was used to compare mental health utilization and costs of fee-for-service programs in a public mental health treatment system. Mental health symptoms, functioning, housing and service costs/utilization were compared before and after service use.

Results: Case management costs and units significantly decrease; medication management units decrease significantly; medication management costs/units are significantly lower than case management costs/units; both functioning scores and depression scores show improvement. All service utilization, including case management decreases over a twelve-month period.

Conclusions: Participation in mental health services, including case management, was associated with substantial decreases in community-based behavioral health services. Reductions in costs of inpatient services and increases in case management costs during the first six months post enrollment resulted in systems cost savings.



Introduction

The United States makes sizable investments in treatments for behavioral health services; spending on mental illness treatment accounts for \$89 billion of total U.S. health spending [1]. This high cost of providing treatment should result in robust treatment outcomes, but the behavioral health system experiences mixed outcomes for its services. For individuals who engage in treatment, outcomes tend to be favorable, but a key issue in providing services is the lack of engagement. In 2016, over 50% of adults with mental illness did not receive any mental health services [2]. Multiple barriers to treatment exist, including system issues such as access to care, financial barriers [3], and treatment and structural barriers such as inconvenient programming and inability to obtain an appointment [4]. Non engagement in treatment varies across populations and health care settings [4], and over time [3]. There are also financial barriers to treatment; U.S. individuals compared with those from Ontario or the Netherlands were significantly more likely to report a financial barrier to mental health treatment [4]. Over the past decade, while public attitudes towards seeking mental health treatment have become more favorable [5], financial barriers to mental health treatment have increased [3].

The U.S. health system redesign (Affordable Care Act) has changed health care funding strategies that have impacted the costs of mental health services. While the availability of and access to public health care services tends to meet the public need [6], the demands and needs for behavioral health care continue to be underfunded and under resourced. In fact, the pressures of scarcity have often forced a reconceptualization of behavioral health services planned in response to insufficient resources to meet expressed demands or underlying needs. As behavioral health service systems examine how to deploy resources while still meeting the needs of the persons that they serve, the economic pressure to provide more treatment for less money becomes a critical objective in planning. Cost-effectiveness analysis and planning have been critical tools for planning behavioral health systems [7-9]. Current planning efforts include economic evaluations of services, including: 1) determination of the balance of benefits and costs; 2) informing practice to determine if an intervention is cost efficient; and 3) supporting policy decisions [10]. The Substance Abuse and Mental Health Services Administration's (SAMHSA) support for the use of cost-effectiveness models is demonstrated in their reports of the reduction in costs and commensurate increase in mental health services such as crisis stabilization, community-based residential crisis care and mobile crisis [11]. Data on the cost-effectiveness of various mental health interventions and services are available in the literature [12-17] and report the cost and effectiveness of service and intervention models.

Beaver County's Project Recovery's was designed to transform how public mental health and substance abuse services are organized, managed and delivered, to ensure that they are welcoming, peer-driven, recovery-oriented, trauma-informed, integrated, and supported through evidence-based and best practices. The project was implemented in Beaver County, a Pennsylvania semi-rural county with a diverse population with varying economic resources and served adults 18 years of age and older with a serious mental illness (SMI) and/or a co-occurring mental health and substance use disorder. Project Recovery was implemented during a time period when the mental health system was developing countywide standards for case management as the single point of accountability in the system

of care. This designation was intended to transform the provision of case management in the County through a single point of accountability (SPA).

Project Recovery was a county wide intervention that provided services to individuals with behavioral health disorders. Services provided included accessing community and behavioral health services, providing follow along services as desired by the consumer, peer support and evidence-based services such as supported employment and supported education. The Project Recovery research questions were: (1) did enrollment in Project Recovery increase community mental health service utilization and costs; (2) did enrollment in Project Recovery result in decreased inpatient behavioral health service utilization and costs and (3) did Project Recovery clients report reduced mental health symptoms and increased functioning over time.

Methods

Target population

The target population comprised adults 18 years and older that were enrolled in case management services via a single point of accountability (SPA) model. The population was 61% female, 79% white and 17% African American, and the greatest proportion were in age range 35-54 years old. At baseline the top two diagnoses were bipolar disorder and major depression.

Data collection and sources

Baseline demographic and referral source information was collected at intake following acceptance into a case management program accessed through a SPA. Individuals could choose to participate in data collection; those who chose not to participate in the data collection efforts were still eligible for services. Substance Abuse and Mental Health Services Administration (SAMHSA) National Outcome Measure data were collected at baseline, six and twelve months and at discharge. Mental health services utilization data was retrieved from a Health Choices claims database, a mandatory managed care program for medical assistance recipients in Pennsylvania. County based funded services were measured in the same way, using the same units of services and costs for individuals who were not eligible for HC.

Study design

The study design was observational; one-way within-subjects ANOVA procedures were used as well as nonparametric tests. Specifically, one-way within-subjects ANOVA procedures were used for analyzing functioning and depression outcomes over time, while Friedman's Test and Wilcoxon Signed-Ranks Test were used to test for specific changes in costs and units for case management and medication management services over time. Friedman's Test was applied to check for indications of a general change over time, and any significant results were followed up with the Wilcoxon procedure to determine when significant changes occurred.

The perspective for this analysis was the public mental health and substance use disorder (SUD) system and included costs of mental health services, SUD services and housing assistance. Our analysis did not include federal housing support such as Shelter Care Plus, Section 8, or federal administrative costs of income support. Our measure of justice system costs was limited to only behavioral health services provided in the community for individuals who may have been involved in the

justice system. Consequently it did not include changes in incarceration costs or costs of crime that may have been reduced. The analysis did not include use or costs of physical health services or pharmaceuticals.

Data Sources

Cost data, which comprised county base and medical assistance claims, was used for the purpose of summarizing behavioral health services costs for individuals before and after enrollment into the program. The data provided were costs of service, units of service (1 unit=15 minutes), and type of service provided. Outcome measures from the National Outcome Measures (NOMS) instrument were used for participant outcome measures; specifically, responses in the categories of functioning and depression

Design/Analyses

Cost analysis

This descriptive analysis summarizes costs and units over time, using time and service type. The first factor, time, is divided into four six-month intervals: 7 to 12 months prior to enrollment; 1 to 6 months prior to enrollment; 1 to 6 months following enrollment; and 7 to 12 months following enrollment. The second factor, service type, had 11 distinct categories, which included case management, community residential rehabilitation, inpatient drug and alcohol, inpatient mental health, long term structured residence (LTSR), medication management, outpatient drug and alcohol, outpatient mental health, peer supports, psychosocial rehabilitation, and supported housing. The cost and unit values were summarized for all 11 service categories and investigated for high cost service categories or trends in cost change over time both generally and for specific service types.

Cost and outcome analysis

This analysis utilized a subset of 104 individuals from the previous Cost Analysis, focusing on the period beginning six months prior to enrollment and twelve months following enrollment. Costs and units of case management and medication management services were summarized for each time interval. The SPA defined the case manager as the primary entity overseeing the individuals care across the system and set uniform county-wide standards to be followed by each provider. The services offered through case management included linking of services, monitoring service delivery, gaining access to services, assessment and service planning, problem resolution, informal support network building, and use of community resources [18]. Medication management included visits to a psychiatrist or clinician working under the auspices of an outpatient psychiatric clinic. The purpose of these visits was to monitor and evaluate the effectiveness of psychotropic prescribing and could include writing, changing, or adjusting a prescription, and/or providing supportive therapy and medication education [19]. These two service categories were targeted as having the greatest potential for association with functioning and depression outcomes. Each of the categories had a set of Likert-scale item rating scales that measured functioning in daily life, and symptoms of depression. Responses to items in each domain were summed and averaged; a higher average denotes more positive responses overall within the domain. Measures for the outcomes were collected at the time of enrollment (baseline), and at 6 month and 12-month follow-up reassessments. Both costs/units and outcome measures were compared across time using the same

three six-month time intervals. Statistical analyses were completed for changes over time for each outcome measure. One-way within-subject analysis of variance (ANOVA) was used to check for significant changes in functioning and depression over the three time intervals. Friedman and Wilcoxon non-parametric procedures were used to check for significant differences of costs and units over the three six-month time intervals.

Results

Sample

The population was 61% female, 79% white and 17% African American, with the greatest proportion in the age range of 35-54 years. At baseline the top two diagnoses were bipolar disorder and major depression.

A group of 269 individuals who accessed case management services in the public mental system was included in the general costs and units analyses. Data from a subset 104 individuals, those for whom claims data was available for a period of one year before and one year after enrollment into the program, was utilized for the costs and outcomes analysis. The criteria for this analysis required that the individual had 6- and 12-month follow-up data.

Overall cost analysis

Analyses were completed to investigate cost changes by service type relative to enrollment and discharge. The purpose was to determine if changes occurred in cost and utilization of services over time. Costs were broken down by type and totaled for four 6-month time intervals from 1 year before enrollment to 1 year after enrollment.

Table 1: Total Costs by Service Type over Time

Service	7 to 12 Months Before	1 to 6 Months Before	1 to 6 Months After	7 to 12 Months After
Case Management	\$671,811	\$1,036,036	\$1,242,429	\$840,491
Community Residential Rehab	\$53,717	\$54,663	\$79,161	\$38,605
Inpatient – D&A	\$0	\$17,250	\$2,679	\$0
Inpatient–MH	\$167,052	\$286,315	\$201,826	\$226,964
LTSR	\$256,783	\$500,108	\$270,973	\$231,380
Medication Management	\$21,123	\$25,923	\$25,704	\$17,523
Outpatient – D&A	\$14,455	\$15,528	\$14,068	\$5,387
Outpatient–MH	\$41,080	\$78,322	\$76,372	\$37,650
Peer Support	\$5,759	\$7,159	\$13,079	\$9,839
Psych Rehab	\$23,726	\$31,198	\$34,458	\$18,014
Supported Housing	\$286,309	\$281,704	\$238,941	\$174,332
TOTAL	\$1,541,815	\$2,334,206	\$2,199,690	\$1,600,185
N	234	266	269	224

Table 1 provides a breakdown of the total costs; overall costs decrease both in the first six months following enrollment, as well as during the 7-12-month post enrollment interval (for a total decrease of \$734,021 from the six months before enrollment). The four largest sources of cost are, in order from greatest to least: case management (\$3,790,767 (LTSR) (\$1,259,245), supported housing (\$981,286), and inpatient MH (\$882,157). A closer look at these four service types shows interesting trends over time. Case management costs increase in the first six months following enrollment, followed by a decrease in the 7-12-month post enrollment interval. LTSR costs decrease in the first six months following enrollment, which is then followed by a second, smaller decrease in the following six months. Housing costs decrease over time. Inpatient costs decrease in the first six months following enrollment, followed by a small increase in the following six months.

Cost and outcome analysis

Analyses were completed to determine if changes in costs, specifically case management and medication management service types, corresponded to increased functioning and reductions in depression symptoms. Information on a matched set of 104 individuals was collected from those with both cost data and NOMS instrument response data for the period ranging from 6 months prior to enrollment to 12 months following enrollment. Specifically, responses related to functioning and depression were used from the NOMS responses for this matched set. Missing data related to the depression measures resulted in a subset of only 89 individuals in the matched set with complete data for the depression measures.

Table 2: Summary of Case Management/Medication Management Costs/Units over Time

Measure/Time	1-6 Months Prior to Baseline		1-6 Months After Baseline		7-12 Months After Baseline	
	(N=104)		(N=104)		(N=103)	
	Cost	Units	Cost	Units	Cost	Units
Case Management	\$500,171	18,150	\$577,865	20,529	\$449,848	15,482
Medication Management	\$8,996	191	\$8,997	190	\$6,872	154
Total (All Services)	\$1,043,148	38,138	\$996,745	42,539	\$753,339	35,206
Total (Per Person)	\$10,030	367	\$9,584	409	\$7,314	342

There was a significant change in case management costs over time ($\chi^2(2) = 12.864, p = .002$) and case management units over time ($\chi^2(2) = 17.149, p < .001$). There was a significant increase in costs ($Z = -3.873, p < .001$), and units ($Z = -3.019, p = .003$), for case management during the first six months following baseline, followed by a significant decrease in costs ($Z = -2.255, p = .002$), and units ($Z = -4.097, p < .001$), to a greater extent during the following six months. The number of individuals requiring case management decreased from enrollment to 7-12 months post enrollment service.

Medication management costs remained stable during the first six months following baseline, and then decreased during the next six months; the changes over time were not significantly different ($\chi^2(2) = 3.328, p = .189$). Medication management units decreased significantly over time ($\chi^2(2) = 6.233, p = .044$). While medication management units remained stable during the first six months following baseline ($Z = -0.790, p = .430$), there was a significant decrease ($Z = -2.144, p = .032$) during the next six months.

The analyses in Table 2 also calculated the average person cost and units. The average person cost decreased by approximately \$3,000 when comparing costs 1-6 months prior to enrollment to 7-12 months post enrollment. The reduction in units is similar to the reduction in average and total costs.

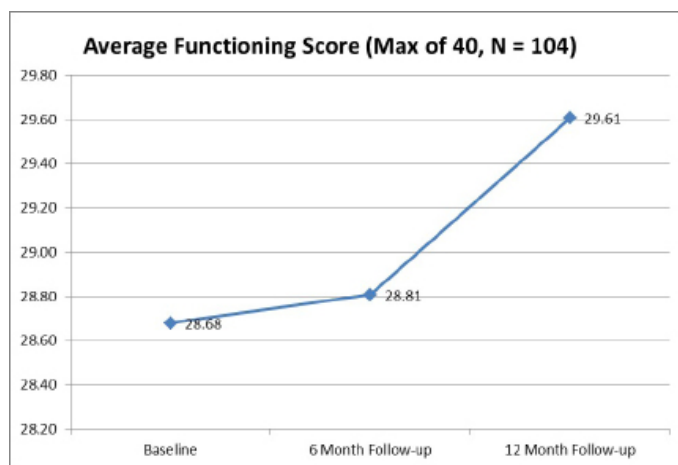


Figure 1: Change in Average Functioning over Time

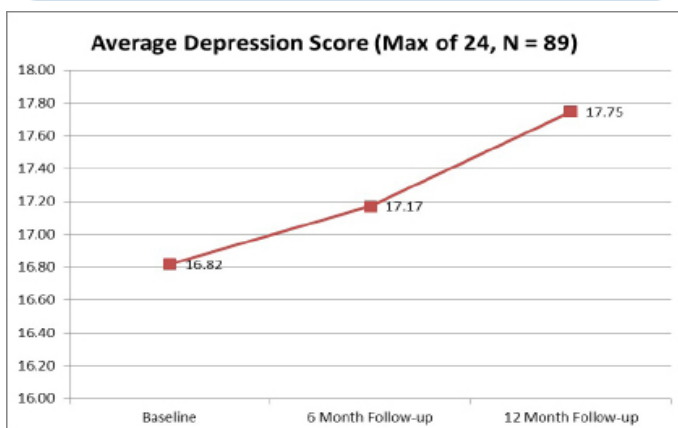


Figure 2: Change in Average Depression over Time

Functioning and depression scores were identified as two measures that could be connected to the receipt of behavioral health services. As displayed in Figures 1 and 2, both sets of scores show incremental improvement at the 6 and 12-month follow-up. These improvements were not found to be statistically significantly, but had a small effect, functioning, $F(2, 206) = 1.615$, $p = .201$, $\eta^2 = .015$, and depression symptoms, $F(2, 176) = 2.270$, $p = .106$, $\eta^2 = .025$. The results show a temporary increase in costs during the first six months, which is followed by long term decreases over time. There is a reduction in case management and medication management units, and total costs for services and total costs/client, there is corresponding improvement in both the areas of functioning and depression symptomatology.

Discussion

Limitations of the study

One of the limitations of this study was the lack of a comparison group. Another concerned the limitations of the available databases. Data utilized were compiled from different data sources which included primary data collected for the evaluation and secondary data from a health claims database. The health claims data included service utilization, service type and cost indices. Inclusion within the sample comprised only those subjects for whom we had cost, service utilization and primary data. This selection bias in our sample may not represent all individuals in Project Recovery.

This study of the costs of services linked to consumer outcomes is an early effort at determining if there is a relationship between costs and outcomes. Case managers were the single point of accountability for individual's care and as such, full-service case management partnerships were a newly added key component of the system of care. Our results indicate that offering provider-based case management triaged with core community human service agencies resulted in an increase in functioning scores, a decrease in depression symptoms, and significant reductions in costs including case management, total services, and total client utilization over time. These results suggest that the provision of coordinated case management services is instrumental for sustaining recovery, as indicated by a decrease in inpatient and residential treatment costs post enrollment in case management services. Of the core services generally offered in mental health service systems (i.e. assessment and/or treatment), case management services have historically been used as a method to address deficiencies in community mental health services, such as fragmented service systems and lack of continuity of care, through managing and coordinating services. Numerous reviews of studies of the effectiveness of case management in mental health services have been conducted, and the majority have indicated that case management improves outcomes [20]. The provision of case management for referral to and monitoring of engagement in community based human services were most costly at the beginning of the initial care episode and then decreased over time; however as the costs decreased, consumer outcomes were improved and then sustained over time.

Treatment engagement increased and utilization of community-based service increased, reducing the key barriers of access, probably as a result of increased case management efforts. The costs for peer support and psychiatric rehabilitation increased over time, demonstrating a cultural shift in treatment services towards a recovery framework. These changes occurred dur-

ing a period of time when program efforts were being made to transform the system into a more comprehensive system of care, as a result of support from the SAMHSA's system transformation efforts. Based on our findings, the next step in designed optimized treatment is to determine if additional treatment components, in addition to case management, can be used to predict client outcomes and costs. Combinations of these elements could then be tested to determine which components of the system of care are the driving predictors of clients' outcomes and costs.

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Ethical approval

This study was approved by the University of Pennsylvania's Institutional Review Board #4 (protocol #813534) and all participants consented to inclusion of their data via an IRB-approved, signed consent form.

References

1. Kaiser Family Foundation. [healthsystemtracker.org/chart-collection/current-costs-outcomes-related-mental-health-substance-abuse-disorders/#item-disease-burden-alcohol-use-disorders-higher-average-u-s](https://www.kff.org/health-system/chart-collection/current-costs-outcomes-related-mental-health-substance-abuse-disorders/#item-disease-burden-alcohol-use-disorders-higher-average-u-s). 2017
2. Mental Health America. New state rankings shines light on mental health crisis, show differences in blue, red states. 2018.
3. Mojtabai, R. Trends in contacts with mental health professionals and cost barriers to mental health care among adults with significant psychological distress in the United States: 1997-2002. *American Journal of Public Health*, 2005; 95: 2009-2014.
4. Sareen J, Jagdeo A, Cox BJ, Clara I, Ten Have M, et al. Perceived barriers to mental health service utilization in the United States, Ontario, and the Netherlands. *Psychiatric Serv*. 2007; 58:357-364.
5. Mojtabai, R. Americans' attitudes toward mental health treatment seeking: 1990-2003. *Psychiatric Services*. 2007
6. Huang ES, Finegold K. Seven million Americans live in areas where demand for primary care may exceed supply by more than 10 percent. *Health Affairs*. 2013; 32: 614-621.
7. Rosenheck R. Cost-effectiveness of services for mentally ill homeless people: The application of research to policy and practice. *American Journal of Psychiatry*. 2000; 157: 1563-1570.
8. Richardson CR, Faulkner G, McDevitt J, Skrinar GS, Hutchinson DS, Piette JD. Integrating physical activity into mental health services for persons with serious mental illness. *Psychiatric services*. 2005; 56: 324-31.
9. Grimes KE, Schulz MF, Cohen SA, Mullin BO, Lehar SE, et al. Pursuing cost-effectiveness in mental health service delivery for youth with complex needs. *Journal of Mental Health Policy and Economics*. 2011; 14: 73.

10. Knapp M, McDaid D, Evers S, Salvador-Carulla L, Halsteinli V. & the MHENN Group. Cost effectiveness and mental health. London School of Economics. Personal Social Services Research Unit. 2007.
11. Substance Abuse and Mental Health Services Administration. Crisis Services: Effectiveness, Cost-Effectiveness, and Funding Strategies. HHS Publication No. (SMA)-14-4848. Rockville, MD: Substance Abuse and Mental Health Services Administration, 2014.
12. Basu A, Kee R, Buchanan D, Sadowski LS. Comparative cost analysis of housing and case management program for chronically ill homeless adults compared to usual care. *Health services research*. 2012; 47: 523-543.
13. Costello EJ, He JP, Sampson NA, Kessler RC, Merikangas KR. Services for adolescents with psychiatric disorders: 12-month data from the National Comorbidity Survey-Adolescent. *Psychiatric services*. 2014; 65: 359-66.
14. Goetzel RZ, Long SR, Ozminkowski RJ, Hawkins K, Wang S, et al. Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting US employers. *Journal of Occupational and Environmental Medicine*. 2004; 46: 398-412.
15. Insel, T. R. Assessing the Economic Costs of Serious Mental Illness. *American Journal of Psychiatry*. 2008; 165: 663-665.
16. Lynch FL, Hornbrook M, Clarke GN, Perrin N, Polen MR, et al. Cost-effectiveness of an intervention to prevent depression in at-risk teens. *Archives of General Psychiatry*. 2005; 62: 1241-1248.
17. Naylor C, Parsonage M, McDaid D, Knapp M, Fossey M, et al. Long-term conditions and mental health: the cost of co-morbidities.
18. Office of Mental Health and Substance Abuse Services Bulletin Number OMHSAS-10-03-06/14/2010
19. Office of Mental Health and Substance Abuse Services Bulletin Number OMHSAS 28-99-02, 29-99-01, 4/26/1999.
20. Ziguras SJ, Stuart GW. A meta-analysis of the effectiveness of mental health case management over 20 years. *Psychiatric services*. 2000; 51:1410-1421.