Demonstration to Maintain Independence and Employment in Texas: Long-Term Follow-Up of Health Service Utilization and Employment Outcomes

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1. Introduction

The Texas DMIE project, called Working Well, was designed to address the health, employment, and social needs of employed adults in the hopes of forestalling or preventing application for federal disability benefits. The program was based on a model which posits that using a person-centered approach incorporating motivational interviewing and an integrated case management – vocational support model, along with enhanced access to healthcare and employment supports, will improve individuals' physical and mental health, enhance quality of life, and promote sustained employment. In the longer term, these factors were expected to bolster participants' independence and help them avoid reliance on government support. To qualify for the Working Well study, participants had to have a diagnosis of either serious mental illness (bipolar disorder, schizophrenia or major depression) or a combination of a behavioral condition with a physical health condition that put them at risk of disability. Other criteria for participation included being employed for an average of at least 40 hours per month, not receiving Medicaid, and not currently having applied for or been certified as eligible for Social Security disability benefits (SSI, SSDI) according to self-report. Texas DMIE participants were working adults aged 21–60, most living at or below federal poverty level and without access to employer-based health insurance. Participants were all enrolled in the Harris County Health Department's "Gold Card" program, which provides Medicaid-like health services to Harris County residents on a sliding-scale basis, based on household income (Bohman et al., 2011).

The original evaluation of outcomes in the first 18 months post-baseline found that intervention participants reported less difficulty accessing prescription services than controls (13% vs 26%, p<.01) and that intervention participants were less likely to report new SSI/DI benefits than controls (6% vs 8%, p=.02). Study condition was not associated with outpatient or inpatient/emergency services, or with employment (Bohman et al., 2011).

2. Methods

The University of Texas at Austin Institutional Review Board reviewed and approved use of the Texas 2007 and May 2008, including demographic and diagnostic information. In addition, participants' Social Security number and Medicaid number were matched to DMIE participants' administrative data regarding healthcare utilization, Medicaid eligibility, and wage information for the 5-year period between January 2010 and December 2014. Data used in the long-term follow-up includes county-level indigent care and Medicaid health services utilization data, state-level Medicaid eligibility information, and state employment wage records.

We addressed the problem of uncertain loss to follow-up status among DMIE participants by adjusting for baseline characteristics in multivariable models and by analyzing the outcome data in three ways: 1) looking at the first year of long term follow-up only (2010); 2) looking at all long term follow-up years combined; and 3) looking at longitudinal models including time and time by study condition interaction effects. In the first two approaches, we used multivariable logistic regression models to predict each binary outcome variable: use of any outpatient services; use of any pharmacy prescriptions; use of any inpatient or emergency room services; Medicaid eligible due to disability; and any earned income. In the third approach, we used random effects logistic regression models to predict the same 5 outcomes over time with additional covariates for time (year) and a time by study condition interaction.

3. Results

The Texas DMIE had 1,616 study participants, including 904 (56%) intervention condition participants and 712 (44%) control condition participants. DMIE intervention and control participants were enrolled from April 2007 up until the first week of June 2008, and intervention participants received services for an average of 21 months. Participants did not differ significantly by study condition on demographic characteristics measured at baseline. Study participants tended to be unmarried, middle-aged, female, Black and Hispanic/Latino, with at least a high school degree. Most participants had been recruited for the study by mail rather than in-person (57.6%). By occupational category, health care support workers made up the largest single occupational group (13.9%); many of these health care support workers were home health aides (Bohman et al., 2008).

Participants also were equivalent across study condition in terms of enrollment diagnosis group. Around a third (34.7%) had co-occurring mental and physical health diagnoses. A tenth (9.8%) had mental, physical, and substance use diagnoses. Two-fifths (22.6%) had co-occurring behavioral and physical health diagnoses, while another 6.7% had co-occurring behavioral health, physical health, and substance use diagnoses. Substance use and physical health diagnoses co-occurred for 15.2%. Finally, 7.5% had a serious mental illness diagnosis, and another 3.4% had co-occurring serious mental illness and substance use diagnoses.

Outcome analysis (Table 1) showed that study condition was not associated with outpatient or inpatient/emergency service utilization or with likelihood of Medicaid eligibility due to disability, or with employment status in the long term follow-up period. However, compared to controls, intervention participants were more likely to use pharmacy services in the first year of follow-up (2010) (odds ratio = 1.34, p=.010) or at all over 5 years of follow-up (2010-2014) (odds ratio = 1.33, p=.029).

In subgroup outcome analyses (Table 2) of participants with serious mental illness diagnoses (n=177), intervention participants were significantly more likely than controls to use pharmacy services at all over 5 years of follow-up (odds ratio = 2.81, p=.007) and more likely to be employed in longitudinal analysis (odds ratio = 4.91, p=.037).

Longitudinal use of pharmacy services and employment outcomes by study condition and SMI diagnosis are shown in Figures 1 and 2. In Figure 1, pharmacy services decline over time for all groups. The lowest utilizing group is the serious mental illness comparison group, followed by the serious mental illness intervention group. In Figure 2, employment in each year declines for all groups, with the serious mental illness control group having the lowest proportion of any earned income, followed by the serious mental illness intervention group.

4. Discussion/Policy Implications

Taken together, the results of our analysis offer minimal support for the long-term effectiveness of early intervention services to reduce dependence on federal disability benefits. Compared to controls, intervention participants were no more likely to be employed, they were equally likely to be eligible for Medicaid due to disability, and they showed similar patterns of medical service utilization, differing only in pharmacy service utilization which was lower for the control than experimental group.

In the subgroup analysis of DMIE participants with serious mental illness, the positive effect of the intervention on prescription drug use persisted. In addition, there was a significant association of study condition with a greater likelihood of employment in this population. Observed outcomes by study condition and serious mental illness group suggests that although intervention participants with serious mental illness had lower levels of employment over time than non-serious mental illness participants in either study condition, they still were considerably more often employed than control participants with serious mental illness who did not receive the early intervention services. This raises the intriguing possibility that early intervention services may be especially valuable for people with this notoriously persistent disability.

There are several study limitations. First is the unknown status of participants over the study period in terms of loss to follow-up. While this is a weakness, there is no reason to expect that loss to follow-up was associated with original DMIE study condition. Second is the small number of participants in the serious mental illness subgroup. Because of this, analyses of outcomes with a low prevalence may have been affected by under-powered statistical models. Third is the fact that Texas' DMIE study population was uniquely selected to meet defined eligibility criteria and did not represent the larger employed adult population with potentially disabling conditions. Thus, study results may not be generalizable to other working-age populations of adults in the state.

While our results offer minimal support for the long-term effectiveness of early intervention models to reduce dependence on disability benefits, it is also true that there have been changes in federal policies regarding both health care coverage and employment services that could alter the context in which these models operate. Given initial positive results of DMIE, along with some evidence for the long-term positive effects on labor force participation for the vulnerable group with serious mental illness, it may be premature to abandon these efforts. Hopefully, future studies can assess more clearly defined models based on recently validated evidence-based practices and bolstered by established fidelity, so that the full potential of early intervention can be more completely understood.

Table 1. Analysis of post-intervention outcomes among all DMIE participants (N=1,616). The first model is a multivariable logistic regression predicting the occurrence of the outcome in the first year of long term follow up (2010). The second is a multivariable logistic regression predicting the outcome during the period 2010-2014. The third is a multivariable random effects logistic regression model of the outcome by year, 2010-2014.

Outcome	Model Term[1]	Model 1 Outcome in 2010	Model 2 Outcome Summary 2010-14	Model 3 Outcome Longitudinally by Year 2010-14
		OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Outpatient Healthcare Services Use	Time (Year)	NA	NA	1.06 (0.96, 1.16), p=.304
	Study Condition	0.97 (0.63, 1.48), p=.883	1.01 (0.77, 1.34), p=.929	0.95 (0.45, 2.03), p=.206
	Study condition * Time	NA	NA	0.95 (0.83, 1.07), p=.292

Pharmacy services	Time (Year)	NA	NA	0.62 (0.57, 0.64), p<.001
	Study Condition	1.34 (1.0, 1.67), p=.010	1.33 (1.03, 1.71), p=.029	1.30 (0.90, 1.89), p=.056
	Study condition * Time	NA	NA	0.92 (0.88, 1.97), p=.132
Inpatient or emergency room services	Time (Year)	NA	NA	1.07 (0.68, 1.71), p=.005
	Study Condition	1.01 (0.49, 2.06), p=.988	0.88 (0.61, 1.27), p=.497	1.09 (0.39, 3.02), p=.387
	Study condition * Time	NA	NA	0.58 (0.26, 1.32), p=.547
Medicaid eligibility due to disability[2]	Time (Year)	NA	NA	0.61 (0.57, 0.65), p<.001
	Study Condition	0.94 (0.70, 1.25), p=.660	0.94 (0.66, 1.31), p=.659	1.32 (0.79, 2.22), p=.359
	Study condition * Time	NA	NA	0.43 (0.02, 9.70), p=.938
Employment (any earned income)[2]	Time (Year)	NA	NA	0.61 (0.57, 0.65), p=.001
	Study Condition	1.10 (0.88, 1.37), p=.414	1.18 (0.92, 1.50), p=.194	1.38 (0.75, 2.53), p=.300
	Study condition * Time	NA	NA	1.26 (0.68, 2.33), p=.723

[1]Models control for participant gender, race/ethnicity, education, marital status, occupation, age, recruitment location, and time since study enrollment.

[2]Models also control for use of outpatient, pharmacy and inpatient/emergency room services.

Table 2. Analysis of post-intervention outcomes among DMIE participants with diagnoses of serious mental illness (SMI) (N=177). The first model is a multivariable logistic regression predicting the occurrence of the outcome in the first year of long term follow up (2010). The second is a multivariable logistic regression predicting the outcome during the period 2010-2014. The third is a multivariable random effects logistic regression model of the outcome by year, 2010-2014.

		Model 1 Outcome in 2010	Model 2 Outcome Summary 2010-14	Model 3 Outcome Longitudinally by Year 2010-14
Outcome	Model Term[1]	OR (95% CI), p-value	OR (95% CI), p-value	OR (95% CI), p-value
Outpatient Healthcare Services Use	Time (Year)	NA	NA	1.16 (0.45, 3.00), p=.936
	Study Condition	1.63 (0.45, 5.93), p=.456	1.43 (0.61, 3.34), p=.411	1.19 (0.17, 8.26), p=.656

	Study condition * Time	NA	NA	2.49 (0.38, 16.50), p=.456
Pharmaceutical healthcare services	Time (Year)	NA	NA	1.85 (0.96, 3.55), p=.104
	Study Condition	1.69 (0.87, 3.27), p=.122	2.81 (1.32, 5.94), p=.007	3.67 (0.86, 15.64), p=.079
	Study condition * Time	NA	NA	3.76 (0.88, 16.19), p=.683
Inpatient or emergency room services	Time (Year)	NA	NA	0.35 (0.09, 1.34), p=.284
	Study Condition	5.29 (0.43, 65.43), p=.195	1.39 (0.50, 3.82), p=.528	2.15 (0.11, 42.08), p=.346
	Study condition * Time	NA	NA	1.38 (0.14, 13.28), p=.372
Medicaid eligibility due to disability[2]	Time (Year)	NA	NA	0.01 (0.00, 0.08), p=.001
	Study Condition	1.00 (0.40, 249), p=.999	0.81 (0.24, 2.68), p=.725	2.09 (0.26, 16.61), p=.487
	Study condition * Time	NA	NA	1.69 (0.35, 8.19), p=.851
Employment (any earned income)[2]	Time (Year)	NA	NA	0.69 (0.58, 0.81), p=.002
	Study Condition	1.41 (0.71, 2.79), p=.325	1.52 (0.69, 3.32), p=.300	4.91 (1.11, 21.86), p=.037
	Study condition * Time	NA	NA	4.04 (0.91, 17.91), p=.659

[1]Models control for participant gender, race/ethnicity, education, marital status, occupation, age, recruitment location, and time since study enrollment.

[2]Models also control for use of outpatient, pharmacy and inpatient/emergency room services.

Figure 1. Relationship of study condition, SMI and any pharmacy services use over time. Percentages are unadjusted observed rates. The figure shows years 2010-2014 on the x-axis and percentage of participants with pharmacy services on the y-axis. Four lines represent each study condition by serious mental illness (SMI) group. All groups decline over time from 60-75% in 2010 to 40-55% in 2014. The group with lowest pharmacy use is the SMI comparison group. The other 3 groups are closer together with SMI intervention below both non-SMI groups.
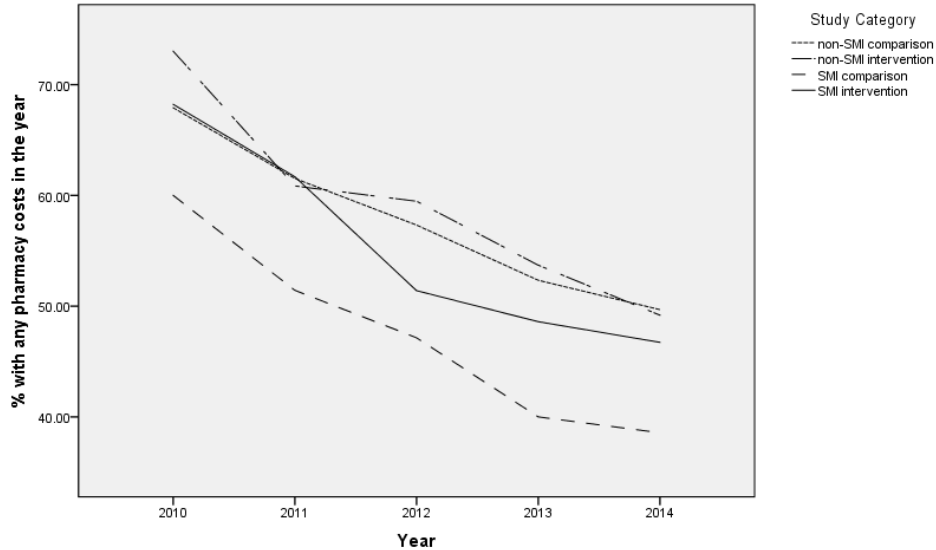

Figure 2. Relationship of study condition, SMI and any earned income over time. Percentages are unadjusted observed rates. The figure shows years 2010-2014 on the x-axis and percentage of participants with earned income on the y-axis. Four lines represent each study condition by serious mental illness (SMI) group. All groups decline over time from 60-75% in 2010 to 45-60% in 2014. The group with lowest employment is the SMI comparison group. The other 3 groups are closer together with SMI intervention below both non-SMI groups.
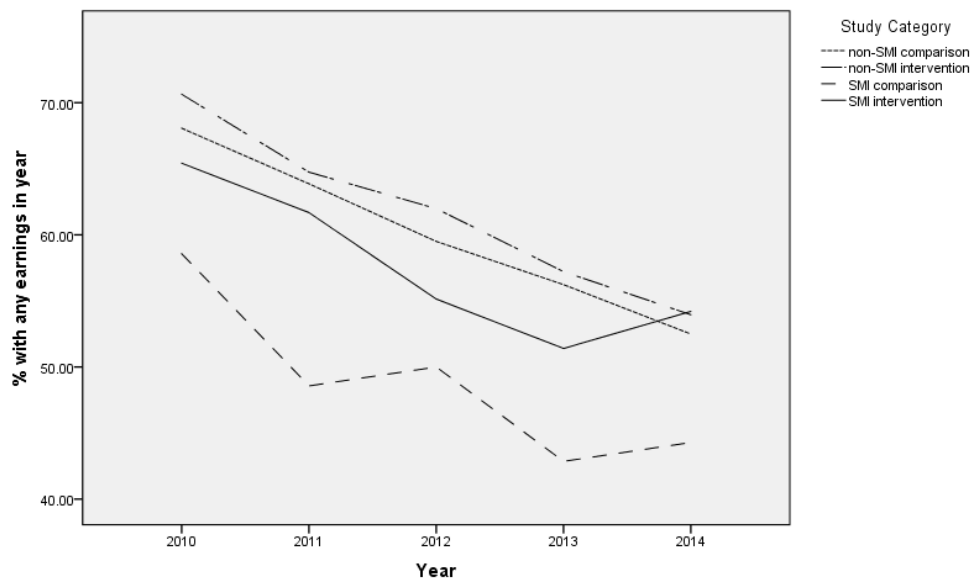
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