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Longitudinal impact of a collaborative care model on employment outcomes in bipolar disorder

Kelly A. Ryan¹, Daniel Eisenberg, PhD³, Hyungjin M. Kim, ScD¹, Zongshan Lai, MPH^{1,2}, Melvin McInnis, MD¹, and Amy M. Kilbourne, PhD, MPH^{1,2}

¹Department of Psychiatry, University of Michigan Medical School, Ann Arbor, MI

²VA Ann Arbor Center for Clinical Management Research, Ann Arbor, MI

³Department of Health Management and Policy (School of Public Health) and Population Studies Center (Institute for Social Research), University of Michigan, Ann Arbor, MI

Abstract

Background—Few treatments are available to directly address employment or work functioning among individuals with bipolar disorder (BD) and currently available treatment models have not been evaluated to examine their impact employment outcomes. We examined impact of affective symptoms and health-related quality of life (HRQoL) on longitudinal employment outcomes in a community-based sample of individuals with bipolar disorder who completed the Life Goals-Collaborative Care (LG-CC) intervention.

Methods—Participants (N=178) were assessed based on HRQoL, employment status, affective symptoms (depressive/manic), and work hours at baseline, 6-, 12- and 24-months after initiation of LG-CC. Frequency of LG-CC sessions and number of care-manager contacts also were ascertained.

Results—At baseline, 21% were employed, 29.5% were unemployed, and 49.6% were on disability. Improvement in affective symptoms was seen over the 24-month period, but not in HRQoL. Lower depression symptoms, but not mania, at baseline predicted greater likelihood of employment status in 24-months. Degree of LG-CC participation was associated with a reduced likelihood of becoming disabled/unemployed and increased number of hours worked in 24-months.

Limitations—The study was originally designed to compare implementation strategies and not the effectiveness of LG-CC on employment outcomes. Further, it was unclear whether improvement in work functioning were personal goals of the participants of this study.

Conclusions—Fewer depressive symptoms were associated with positive employment outcomes over time. Collaborative Care Models that are already implemented by existing

Address correspondence to: Kelly A Ryan, Ph.D. Department of Psychiatry, University of Michigan, 2101 Commonwealth Blvd, Suite C, Ann Arbor, MI 49105, karyan@umich.edu.

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providers that focus on management of affective symptoms show promise in positively impacting employment outcomes.

Keywords

Bipolar Disorder; Employment; Longitudinal; Outcomes; Affective Symptoms; Care Models

Introduction

Bipolar disorder (BD) is a serious mental illness that profoundly affects functioning. It is the 6th leading cause of disability world-wide in ages 18-44 year olds (1). Medication and psychosocial treatments have shown benefits for outcomes including reducing hospitalizations and reoccurrence of mood episodes. Despite these improved outcomes, functional impairment remains high for many people experiencing BD (2-4). Hence, BD is associated with substantial work impairment (e.g., reduced work productivity, poor performance) (5) and instability in the job market.

Nonetheless, few treatments are available to address employment or work functioning among individuals with BD. Further, few longitudinal studies examining change in employment status have been conducted in clinical or community samples. Specific employment interventions for persons with serious mental illness, including supported employment, can help individuals compete for competitive employment and increase hours worked (6). However, many individuals with serious mental illness do not have access to employment services (7, 8), and supported employment may not be readily available for under-resourced community-based practices. Understanding how currently available treatment models can impact employment outcomes for persons with serious mental illness can help providers better tailor treatment options for this group.

Collaborative care models (CCMs) are evidence-based practices implemented by existing providers that have shown to improve medical and psychiatric outcomes for persons with chronic mental disorders (9). Central to CCMs is self-management and care management that focus on helping individuals manage their symptoms as a means of maximizing quality of life and functioning. Life Goals Collaborative Care (LG-CC), a particular type of CCM developed for individuals with BD, has shown in several randomized controlled trials to improve reduce affective symptoms and improve quality of life in community-based practices (10). While CCMs such as LG-CC do not specifically focus on employment, it might be assumed that improvements in symptoms will have an effect on employment outcomes, but this has not been formally examined.

This study examines the longitudinal course of employment outcomes during and after a 12-month LG-CC program, and after 24-months post initiation of LG-CC. We hypothesize that those who show improved symptoms and improved HRQoL will show improved work outcomes (increases in employment rates, increased number of hours worked) after a 12-month follow up period. We further hypothesize that employment outcomes will change as mood symptoms and HRQoL improves.

Methods

Participants and Procedure

This study involves longitudinal data analyses from the Recovery-Oriented Collaborative Care (ROCC) study. Details regarding the ROCC study design are described elsewhere (11). In brief, ROCC compared two different implementation strategies (standard vs. enhanced) designed to promote the use of LG-CC among 384 participants receiving care from seven community-based mental health or primary care clinics sites (12). Because no significant changes were found between the implementation strategies in changes in mood symptoms, HRQoL, or functioning, the data from both implementation arms were combined for this study. A subset of participants who were employed, unemployed, and disabled were included in this analysis (N=353). Those who self-identified as being employed or self-employed were included in the *employed* group. Number of hours worked per week was collected. Those who were unemployed or “unable to work,” but not on currently disability were included in the *unemployed* group. Those who identified as being “disabled” were included in the *disabled* group. Those who were retired (n=8), students (n=9), or considered themselves as homemakers (n=12) at baseline were excluded from the analyses.

Participants completed outcome measures at baseline, 6-, 12- and 24-month post initiation of the LG-CC. A demographics survey ascertained information (age, education, race, etc.) along with current employment status, disability status, and number of hours worked. Outcome measures included health-related quality of life (HRQoL; SF-12) and psychiatric symptoms (Internal State Scale-ISS, PHQ-9, see (13)). LG-CC participation, which is total number of LG-CC group sessions attended plus the number of care manager contacts completed during the 12 months by the LG-CC participant, was obtained.

Statistical Analyses—We compared baseline to 24-month outcome variables using two-tailed paired sample t tests. Linear mixed-effects regression models were conducted to examine the association of predictors with the number of hours worked (continuous variable); whereas generalized linear mixed effect models with logit link function were used to examine the association of predictors with categorical work status variables (employed vs. unemployed or disabled). These models were used to account for the clustering effects of multiple measurements of the outcome variables from the same individual on different follow ups, as well as to allow for time-dependent covariates. Covariates including age, education, HRQoL, psychiatric symptoms, and LG-CC participation (13) were included in the models. To assess if employment status changes were mediated by changes in mood symptoms, depressive symptom scores were included and excluded from the multivariable work status model. SAS 9.3 (Cary, NC, USA) was used for all the statistical analyses of this study.

Results

Those in the disabled group were older (M=44.2, SD=10.5) than the employed group (M=38.0, SD=11.3), but no different from the unemployed group (M=39.9, SD=10.7). The disabled group were less likely to be college educated (N=22; 12.6% college educated) compared to the employed group (N=16, 21.9%) (Table 1). There was a difference between

employment status (employed vs unemployed) when comparing baseline employment status to employment status at 24-months follow up, $\chi^2(1)=6.12, p=.0214$. Specifically, a large proportion of those unemployed at baseline ($N=478$) were employed at 24-months ($N=16$). For the individuals employed at baseline ($N=40$), there were 5 who were unemployed at 24-months follow up. Further, most of the individuals who were employed at baseline ($N=34$) maintained employment at 24-month follow up ($N=29$). The majority of those who were disabled at baseline ($N=99$) continued to remain on disability at 24-month follow-up ($N=85$).

A generalized linear mixed model showed that the likelihood of being unemployed (compared to employed) decreased over time ($\beta=-0.0373$, $OR=0.96, p=0.0044$), but there was no effect of time on the likelihood of becoming disabled (compared to employed, $p=0.9371$). Time was not significantly associated with number of hours worked per week ($p=0.0717$).

After adjusting for demographic variables (age, education, race), a generalized linear mixed effect model showed that PHQ-9 was significantly associated with employment status during the follow-up period (when considering baseline, 6-, 12-, and 24-month employment status). A higher PHQ-9 score was significantly related to a higher likelihood of being unemployed ($OR=1.06, p=0.0262$), but PHQ-9 was not significantly associated with becoming disabled vs. employed ($p=0.2040$) or disabled vs. unemployed ($p=0.3929$).

Increased LG-CC participation was significantly associated with reduced likelihood of either becoming disabled or unemployed (ref: employed, respectively $OR=0.87$, and $0.90, p=0.0157$, and 0.0354) after adjustment for demographic variables (age, education, gender). LG-CC sessions continued to be significantly associated with reduced likelihood becoming disabled or unemployed (ref: employed: respective $ORs=0.88$, and $0.91, p=0.0215$, and 0.0614) when adding the effects of depressive symptoms. Adjusting for demographic variables, results also revealed that LG-CC session participation was associated with increased number of hours worked across follow-up periods among those who held employment during the follow-up periods ($p=0.0384, p=0.0099$, respectively).

Discussion

We investigated correlates of employment status and number of hours worked after initiation of a well-established LG-CC program. We found that employment status improved over time, and reduction of total PHQ-9 severity scores (indicating a reduction in depression-related symptoms) was associated with improvement in employment status. However, total PHQ-9 severity scores were not associated with changes in disability status during the follow-up period. Greater number of LG-CC sessions completed was also associated with greater likelihood of employment status and number of hours worked over the 24-month period.

CCMs, such as LG-CC, are designed to emphasize patient self-management through patient education and ongoing coordination of medical and mental health by current practitioners. Research on LG-CC's impact on outcomes traditionally focus on improvements in quality of

life, symptoms, and health, but to date have not focused on other aspects of daily functioning that may provide a more global perspective on functional recovery, such as employment status. These findings, based on a large longitudinal sample of individuals with bipolar disorder, suggest that LG-CC can impact both symptom burden and employment status (employed vs unemployed) over time, thus highlighting the importance of focusing on affective symptoms throughout the course of interventions. However, improvements in total PHQ-9 severity scores did not relate to disability status, suggesting that changes in depression-related symptoms may only impact more transient employment status during a 24 month period rather than disability status, which is considered more a permanent or unmalleable status. Increased LG-CC attendance improved number of hours worked per week, suggesting that participants who were more engaged with the treatment provider and more focused on their wellness goals, were able to attend work more frequently.

This study has limitations that may affect overall generalizability. First, the study was designed to compare implementation strategies and not the effectiveness of LG-CC versus other treatments, so there was no comparison group to assess the differential effect of LG-CC on employment outcomes. Lastly, it was unclear whether improvement in work functioning were personal goals of the participants of this study and may be a driving force to increases in employment rates over the course of LG-CC.

Conclusions

Overall, improvement in affective symptoms can positively affect employment outcomes, and increased number of LG-CC sessions has a positive influence on number of hours worked per week. These results suggest that LG-CC is a promising treatment model to influence more global indicators of functioning in bipolar disorder, beyond self-reports of affective symptoms and quality of life. Future investigations into the LG-CC program could capture overall level of functioning within the work environment to determine if more hours worked per week translates into better employment outcomes or overall quality of work functioning. Implementation of LG-CC, or similar CCMs, may hold promise in helping individuals with bipolar or other serious mental disorders improve mood symptoms which can have positive effects on competitive employment, increasing number of hours worked, and ultimately may reduce the cost of disability and lost wages.

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Highlights

- Improvements in affective symptoms over the 24-month period predicted likelihood of employment status.
- Changes in health related quality of life did not predict employment status at 24-month follow up.
- Participation in the collaborative care model (frequency of sessions and number of care manager contacts) reduced likelihood of becoming disabled or unemployed and increased number of hours worked.
- The Life Goals Collaborative Care model is a promising treatment model to influence more global indicators of functioning in bipolar disorder, beyond self-reports of affective symptoms and quality of life

Table 1
Demographic and clinical characteristics of sample, Results of Random Effect Linear Mixed Regression

	Employed	Baseline Unemployed	Disabled	Employed	6 month Unemployed	Disabled	Employed	12 month Unemployed	Disabled	Employed	24 month Unemployed	Disabled
(N%)	74 (21)	104 (29.5)	175 (49.6)	62 (25.2)	63 (25.6)	121 (49.2)	60 (27)	44 (19.8)	118 (53.2)	56 (28.1)	28 (14.1)	115 (57.8)
Al Characteristics	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
9 a	12.1 (6.2)	13.3 (6.7)	13.6 (6.3)	9.3 (7.0)	11.6 (6.7)	10.7 (6.5)	9.5 (6.7)	11.1 (6.9)	11.1 (6.5)	9.4 (6.9)	7.6 (6.4)	10.9 (6.5)
20 b	20.9 (13.0)	21.4 (12.9)	20.6 (12.5)	16.9 (10.8)	17.7 (11.7)	16.7 (12.1)	18.1 (13.1)	17.7 (10.9)	17.0 (12.4)	14.7 (12.4)	17.8 (14.5)	17.1 (12)
38 c	38.3 (6.8)	38.3 (6.6)	34.6 (7.7) ^{e*}	39.4 (7.3)	38.4 (6.3)	34.8 (8.2) ^a	38.9 (7.3)	38.6 (8.5)	34.5 (8.0) ^a	37.9 (7.2)	37.5 (8.2)	35.2 (7.4)
32 d	32.7 (8.7)	31.2 (8.4)	31.8 (8.4)	33.0 (8.0)	32.3 (8.6)	32.7 (8.2)	33.9 (6.8)	34.3 (9.0)	34 (8.3)	34.0 (8.3)	36.4 (7.6)	33.2 (7.4)
Hours worked ^d	24.5 (13.0)			24.6 (12.7)			27.5 (14.3)			28.7 (13.1)		

Table 2
Number Hours worked Parameters estimates (standard errors)

	Beta	95% CI	T (df=268)	P	Beta	95% CI	T	P
employed	0.00594	-0.02, 0.03	0.48	0.6346	-0.1960	-0.47, 0.08	-1.41	0.1644
disabled	0.07715	0.05, 0.11	5.29	<.0001	-0.5062	-6.51, 5.50	-0.17	0.8694
employed	-0.2061	-0.74, 0.32	-0.76	0.4475				
disabled	0.4760	-0.15, 1.10	1.49	0.1387				
employed	-0.2751	-0.86, 0.31	-0.92	0.3572	7.2498	0.56, 13.94	2.12	0.0384
disabled	-0.0897	-0.76, 0.58	-0.26	0.7928				
age educated	-0.1703	-0.79, 0.45	-0.54	0.5902	4.9480	-1.67, 11.57	1.46	0.1490
employed	-1.3963	-2.16, -0.64	-3.60	0.0004				
disabled	0.05467	0.01, 0.10	2.24	0.0262	-0.3564	-0.79, 0.09	-1.58	0.1204
employed	0.03180	-0.02, 0.08	1.27	0.2040				
disabled	-0.00034	-0.02, 0.02	-0.03	0.9731	0.07182	-0.12, 0.26	0.75	0.4575

Mixed Effect Regression Models	Employed ^f vs Unemployed Vs. Disabled Parameters estimates (standard errors)				Number Hours worked Parameters estimates (standard errors)			
	Beta	95% CI	T (df=268)	P	Beta	95% CI	T	P
1Unemployed								
2Disabled	-0.01393	0.04, 0.01	-1.27	0.2047				
MCS ^c	0.01719	-0.02, 0.05	0.95	0.3442	-0.1250	-0.45, 0.19	-0.76	0.4493
1Unemployed								
2Disabled	-0.02833	-0.06, 0.01	-1.55	0.1218				
PCS ^c	0.01148	-0.02, 0.05	0.63	0.5279	-0.0258	-0.41, 0.36	-0.13	0.8951
1Unemployed								
2Disabled	-0.05420	-0.09, -0.02	-2.87	0.0045				
LG-CC Sessions ^g	-0.1051	-0.20, -0.01	-2.11	0.0354	-1.4948	-2.68, -0.31	-2.47	0.0169*
1Unemployed								
2Disabled	-0.1394	-0.25, -0.03	-2.43	0.0157				

^aPHQ-9=Patient Health Questionnaire-9; a higher score reflects more symptoms related to depression

^bISS=Internal State Scale; scores range from 0 to 50 and a higher score indicates worse symptoms related to mania

^cHealth-related quality of life (SF-12) includes a mental component scale (MCS) and physical component scale (PCS). Possible scores range from 0 to 100, with higher scores indicating better health. For both summary scores, the population Mean $\pm$ SD is 50 ± 10

^dNumber of hours worked per week

^eDisabled>Employed

^fEmployed group is reference group

^gTotal of number of LG-CC sessions attended and number of care manager contacts completed by LG-CC participant