

Use of a Mental Health Center Collaborative Care Team to Improve Diabetes Care and Outcomes for Patients With Psychosis

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Objective: This study aimed to evaluate the feasibility, acceptability, and preliminary effectiveness (compared with usual care) of a collaborative care model to treat community mental health center (CMHC) patients with psychosis and poorly controlled diabetes.

Methods: Stakeholder input was used to adapt a primary care-based collaborative care intervention for CMHC settings. Thirty-five adult CMHC clients with type II diabetes and hemoglobin A1c (HbA1c) >8% or blood pressure >140/90 were randomized to receive either collaborative care or usual care. Change in HbA1c was evaluated between baseline and three months. Paired t tests were used for within-group comparisons.

Results: After three months, intervention participants had a statistically significant mean decrease in HbA1c of 1.1% ($p=.049$). There was no significant change in HbA1c in the usual-care group.

Conclusions: This pilot demonstrates the feasibility and acceptability of implementing collaborative care in CMHC settings and its preliminary effectiveness in improving glycemic control in a high-risk population.

Psychiatric Services 2018; 69:349–352; doi: 10.1176/appi.ps.201700153

Type II diabetes confers a twofold excess risk of cardiovascular disease, stroke, and mortality (1) and contributes significantly to the premature cardiovascular mortality experienced by people with psychotic disorders (2). A psychotic disorder diagnosis is associated with increased risk of type II diabetes and of poor diabetes outcomes, including increased microvascular and macrovascular complications, higher rates of hospitalizations and rehospitalization, and increased mortality (3). These poor outcomes are due, in part, to lower quality of medical care, (4) but few studies have evaluated the effectiveness of care models to improve the quality of medical care for these patients (5).

Integrated care models for persons with psychosis, such as the behavioral health home, have been developed to provide general medical services to community mental health center (CMHC) patients at the CMHC by staff from a primary care partner (6). In a randomized controlled trial comparing the integrated care of a behavioral health home with usual care among 447 outpatients with one or more cardiovascular risk factors at an urban CMHC, patients who received treatment through the behavioral health home were more likely to receive high-quality treatment for diabetes and hypertension but did not have greater improvement in clinical outcomes (7).

Collaborative care is an integrated care model that is based on the principles of the chronic care model (8). The core principles of collaborative care include a team approach and population-based care that is evidence based and driven by measurement of outcomes (9). In a multisite randomized controlled trial in 14 primary care clinics in Washington State, the TEAMcare collaborative care model improved both diabetes and depression outcomes at six-month follow-up among 200 primary care patients with depression and poorly controlled diabetes; improvement was associated with frequent and timely treatment adjustments of both diabetes and depression pharmacotherapy (10).

This report describes the pilot testing of a CMHC-based collaborative care model, adapted from the primary care-based TEAMcare model, to treat type II diabetes among CMHC outpatients with psychosis. Data from qualitative interviews and focus groups of individuals in the target population and clinical providers and feedback from key stakeholders were used to inform intervention adaptations. The clinical team comprised health care providers from a CMHC and the University of Washington Diabetes Center. Preliminary effectiveness was evaluated in a three-month randomized controlled pilot study in which change in hemoglobin A1c (HbA1c) after three months was assessed among participants who received

collaborative care and those who received usual diabetes and psychiatric care.

METHODS

The study was conducted between April 2013 and September 2015 in two CMHCs in King County, Washington, which together provide comprehensive behavioral health services to over 2,000 low-income residents of Seattle.

Stakeholder input was obtained to adapt the TEAMcare model (10) for implementation in community mental health settings for patients with psychosis. In-depth interviews with CMHC case managers (N=4), psychiatrists and advanced psychiatric nurse practitioners (N=4), medical directors of primary care clinics (N=3), and a focus group with primary care providers (N=6) were conducted to inform adaptations to the intervention. [A table listing the collaborative care core components and adaptations for a CMHC setting is available as an online supplement to this report.]

A randomized controlled pilot study of adult CMHC patients with poorly controlled type II diabetes then compared the adapted collaborative care intervention with usual treatment of diabetes and psychosis. Participants were adults ages 18 to 64 who were enrolled to receive mental health services for a primary diagnosis of schizophrenia, schizoaffective disorder, bipolar disorder, or major depressive disorder with psychosis at one of the two participating CMHCs. Inclusion criteria were a diagnosis of type II diabetes established at least six months before enrollment, poor diabetes disease control (either HbA1c > 8% or blood pressure [BP] > 140/90), and the ability to read English. Exclusion criteria included cognitive impairment that precluded provision of informed consent; current suicidality, homicidality, or grave disability that required psychiatric hospitalization; a cardiovascular event in the previous month; and a life expectancy of less than a year.

Participants were randomized at a rate of 1:1, and randomization was stratified based on baseline treatment with insulin or with clozapine or olanzapine.

For the participants who received CMHC-based collaborative care for diabetes, care was provided by a CMHC-based team that included a CMHC nurse care manager, a CMHC psychiatrist, the advanced practice registered nurse who provided primary care onsite at the CMHC, and an endocrinologist consultant. All clinical visits and team meetings were conducted at the CMHC. Team members received training in the TEAMcare model by the original investigators at the University of Washington. Intervention participants had an initial (60-minute) nurse care manager visit for a comprehensive health assessment and an individualized health plan and then 30-minute visits for the support of chronic illness self-management (including medication adherence, healthy nutrition, and regular physical activity) every other week for 12 weeks and monthly thereafter for up to six months. Diabetes education materials were modified to address the unique issues of patients with psychosis. Nurses utilized evidence-based behavioral interventions

(motivational interviewing and behavioral activation) to address barriers to self-management and coordinated care with primary care and specialty medical providers (typically in an organization outside of the CMHC), the CMHC clinical team, and community-based agencies. A treat-to-target approach was used for diabetes and cardiovascular risk factors through weekly systematic caseload review with the team endocrinologist and psychiatrist, focusing on patients who were not improving as expected (11). Participants in the usual care arm continued to receive their usual mental health treatment through the CMHC and their usual medical care for diabetes.

The primary outcome was HbA1c after three months of intervention. Secondary outcomes included BP, tobacco use, and mental health symptom measures. Process measures were also evaluated among participants who were randomized to the collaborative care intervention, including the number of nurse care manager visits.

Chi-square analyses and independent t tests were utilized to examine differences between the groups at baseline. Paired t tests were used for within-group comparisons because, given the small group sizes (N < 20), the test with the most power to illustrate the results over a three-month period is the change in primary outcome within each group.

The study was approved by the University of Washington Institutional Review Board.

RESULTS

Ninety-one patients were screened for eligibility for the pilot RCT; 51 underwent the baseline interview, and 35 were randomized: 18 received the collaborative care intervention, and 17 continued to receive usual care [see CONSORT diagram in the online supplement]. The mean age of participants was 51 years, and more than 40% of both groups had a primary diagnosis of either schizophrenia or schizoaffective disorder. There were no statistically significant baseline demographic or clinical differences between the groups [see online supplement].

Primary outcome data were available for 29 participants; one usual care participant died from a cardiac event. At the three-month follow-up, mean HbA1c among participants randomized to the collaborative care intervention decreased from 9.4% to 8.3%; this clinically significant change was also statistically significant ($t=2.17$, $df=13$, $p=.049$) (Table 1) (12). Among usual-care participants, mean HbA1c decreased from 8.3% at baseline to 8.0% at three-month follow-up—not a statistically significant change in HbA1c compared with baseline. Both groups had statistically significant decreases in body mass index (BMI) after three months (-1 kg/m^2 and $-.9 \text{ kg/m}^2$ in the intervention and usual care groups, respectively). There were no significant changes in smoking or psychiatric symptoms.

The pilot study demonstrated that it was feasible to train existing CMHC nurses and psychiatrists in two CMHCs to provide this team-based care model. Feedback from other CMHC staff at the participating clinics suggested that the

use of existing staff increased the integration of diabetes care for participants into the CMHC clinical workflow. Staff appreciated the increased monitoring of patients' symptom severity and medication adherence and side effects by the nurse care manager. Care coordination around diabetes treatment plans was facilitated by leveraging existing intraclinic communication and clinical meetings.

The model also appeared to be acceptable to participants, as the mean duration of treatment with the care manager was 14.8 weeks (range=9–27 weeks), and the mean number of visits was 4.9. In exit interviews conducted among participants who received the collaborative care intervention (N=15), participants highlighted the convenience of locating this care in their CMHC and noted that visits with the nurse care manager were more accessible, because they could be combined with visits to mental health providers. Almost all also reported a greater degree of comfort with the CMHC setting and feeling understood by behavioral health providers. Most participants expressed the opinion that the intervention would be more helpful if it were longer, as they would have liked additional support to maintain behavioral changes achieved during the study.

DISCUSSION

This pilot RCT demonstrated the feasibility and acceptability of implementing an adapted collaborative care model to treat poorly controlled type II diabetes among CMHC patients with psychosis. The pilot also demonstrates preliminary evidence of effectiveness, with a clinically and statistically significant change in HbA1c among intervention participants at the end of three months of intervention. The potential for applicability of these preliminary findings appears promising, given that existing CMHC clinical staff were trained to deliver the intervention. Given the limited exclusion criteria, the model may improve general medical outcomes even among patients with very complex comorbidity.

This adapted collaborative care model for multiple chronic conditions addresses an important gap in the existing literature. A rigorous RCT of a behavioral health home suggested that improving the quality of medical care for CMHC patients is necessary, but not sufficient, for improving medical outcomes (7). The intervention in this pilot study represents a behavioral health home approach for a specific subgroup at high risk of cardiovascular events and mortality and specific targets for improvement in general medical care

TABLE 1. Change in outcome measures between baseline and three-month follow-up among participants in a collaborative care intervention or usual care^a

Variable	Intervention (N=14)			Usual care (N=15)		
	Change	95% CI	p	Change	95% CI	p
HbA1c (%)	−1.10	−2.20 to −.01	.05	−.40	−1.20 to .40	.30
Systolic BP (mm Hg)	−1.10	−14.30 to 12.00	.85	1.60	−9.00 to −12.10	.75
LDL (mg/dl)	−19.40	−55.20 to 16.50	.26	7.90	−24.70 to 40.60	.61
Triglycerides (mg/dl)	−33.70	−87.90 to 20.40	.20	2.90	−47.40 to 53.30	.90
BMI (kg/m ²)	−1.00	−1.80 to −.10	.04	−.90	−1.70 to −.02	.04
PHQ-9 score ^b	.00	−3.20 to 3.20	1.00	−.50	−3.30 to 2.40	.73
BPRS score ^c	−2.60	−6.60 to 1.40	.19	.0	−3.70 to 3.70	1.0
Current smoking (%) ^d	0	na	1.00	−.07	−.21 to .08	.33
FNDS score ^e	.29	−1.20 to 1.77	.65	−.40	−2.48 to 1.68	.62

^a Abbreviations: HbA1c, hemoglobin A1c; BP, blood pressure; LDL, low-density lipoprotein; BMI, body mass index; PHQ-9, Patient Health Questionnaire-9; BPRS, Brief Psychiatric Rating Scale; FNDS, Fagerstrom Nicotine Dependence Scale

^b Scores range from 0 to 27, with higher scores indicating greater severity of depression symptoms.

^c Scores range from 0 to 126, with higher scores indicating more severe (positive, negative, and affective) symptoms of psychosis.

^d One participant in the usual care group started smoking during the study. There were no other changes in current smoking between baseline and three months.

^e Scores range from 0 to 10, with higher scores indicating more severe physical dependence on nicotine.

(HbA1c and BP). Although resource intensive, it might provide a critical component of a stepped-care approach to addressing cardiovascular risk in a heterogeneous population at a CMHC.

Some limitations of this pilot study need to be acknowledged. First, the study involved a small number of participants from two CMHCs in a single city, all of which may limit the generalizability of the findings. Second, almost 10% of patients who met clinical eligibility criteria were excluded because of their inability to read or speak English, and some of these patients may have responded differently to the intervention. Moreover, patients who were lost to follow-up may have been more likely to have poor outcomes. Finally, the short duration of the study precluded examination of sustainability of the positive changes observed at the end of the intervention or of any long-term outcomes.

This pilot trial provides valuable lessons for behavioral health organizations seeking to integrate care for patients with complex medical comorbidity. First, a systematic approach to identify high-risk patients is required to provide population-based care. Identification of CMHC patients with diabetes and an HbA1c of >8% was very challenging in this study, given that many patients did not have lab data available in either their CMHC chart or clinic administrative data. Second, measurement-based care requires a clinical registry to track medical and laboratory data. A registry integrated into the electronic medical record would be more efficient for the clinical workflow than the ACCESS database used in this pilot study. Third, it is not clear whether the same magnitude of improvement in glycemic control would have been obtained with a primary care physician consultant instead of an endocrinologist—or whether participants' primary care physicians would have found the care model as acceptable without an endocrinologist. Fourth, the challenges and complexities of coordinating care with general

medical providers increased with (administrative and geographic) distance from the mental health center. Finally, patients with complex and severe medical illnesses may need ongoing support and care coordination for periods longer than six months to achieve and sustain the clinical improvement.

CONCLUSIONS

This pilot study demonstrated the feasibility, acceptability, and preliminary effectiveness of a multidisciplinary team based in a CMHC to improve outcomes for diabetes among patients with psychosis. It will be important to evaluate its effectiveness in a larger trial and the costs of such a model before wider dissemination. Future studies might also expand the scope of this care team to address additional chronic general medical conditions (such as heart failure and hypertension), as part of a stepped-care approach that targets resource-intensive intervention for the patients with the greatest clinical complexity.

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The authors gratefully acknowledge support from grant 5R21DK096286-02. This study was a clinical trial (ClinicalTrials.gov registration number: NCT02011529).

The authors report no financial relationships with commercial interests.

Received March 31, 2017; revisions received June 13 and August 5, 2017; accepted September 15, 2017; published online December 1, 2017.

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