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Clinic Appointment Attendance in Adults with Serious Mental Illness and Diabetes

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Abstract

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Conflicts of Interest Statement

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Objectives: To assess characteristics that may predict outpatient appointment attendance in outpatient medical clinics among patients comorbid for serious mental illness (SMI) and type 2 diabetes (DM).

Methods: Baseline covariate data from 200 individuals with SMI-DM enrolled in a randomized controlled trial (RCT) were used to examine characteristics associated with electronic health record-identified clinic appointment attendance using a generalized estimating equations approach. The analyses evaluated the relationship between clinic attendance and potentially modifiable factors including disease knowledge, self-efficacy, social support, physical health and mental health as well as demographic information.

Results: Demographic and mental health characteristics were most associated with clinic attendance in adults with SMI-DM. Physical health was not associated with clinic attendance.

Conclusions: Information on clinical and demographic characteristics and factors potentially modifiable by psychological interventions may be useful in improving adherence to treatment among SMI-DM patients. It is our hope that clinicians and researchers will use these results to help tailor adherence facilitating interventions among people at particular risk for poor engagement in care.

Keywords

visit adherence; diabetes; serious mental illness; randomized controlled trial; generalized estimating equations

Clinical visit “no shows” indicating that patients failed to attend scheduled clinic appointments are a major concern for clinicians, healthcare systems, and other stakeholders because of mounting evidence that no-shows waste resources, are highly prevalent, and are associated with poor health outcomes.¹ Adherence to scheduled clinic appointments is particularly important for patients with serious, comorbid, chronic medical and mental health conditions since attendance is critical in facilitating appropriate treatment planning.^{2,3}

Individuals with serious mental illness (SMI) such as schizophrenia, bipolar disorder and severe or recurrent major depression are at particularly high risk for poor adherence to recommended treatments and mental health clinic appointments.⁴ Type 2 diabetes (DM) is common among those with SMI, and prognosis is worsened by widely prevalent unhealthy behaviors such as smoking, reduced physical activity, poor diet, and substance use.^{5–8} Adherence to medical appointments among the SMI is an understudied, important issue. Limited studies have found that depression predicts medical adherence⁹, and that the presence of a psychiatric disorder impacts adherence to non-psychiatric medications.^{10,11}

Adherence to treatment for both diabetes and mental illness is a major hurdle for patients who are comorbid for these two chronic conditions. Both conditions require consistent commitment to continuing treatment over the course of time. Nevertheless, substantial percentages – as many as 40% (eg Lacro et al 2002, Delamater 2006) of patients – fail to adhere to current evidence-based treatments for both of these conditions.^{12,13} It is estimated that two thirds of the hospitalizations for Medicaid patients with schizophrenia alone are due to poor adherence and cost over \$1.5 billion a year.¹⁴

Improving clinic visit show rates is a major and potentially achievable enhancement in how services are delivered to individuals with SMI-DM. Clinicians often exert great effort to prescribe or recommend treatments that they believe will be effective, however benefits of care plans may never be achieved at least in part due to poor visit adherence. Thus, ensuring that individuals with co-morbid SMI-DM attend their clinic appointments to facilitate their treatment is essential.

There are a variety of factors that should be considered in helping patients to overcome practical barriers to adherence.¹⁵ One issue is identifying those individuals with SMI-DM who are at highest risk for clinic no-shows. A clearer understanding of the relationship between clinic visit adherence and the clinical and psychological characteristics among persons with SMI-DM can potentially inform specific approaches that can be utilized to enhance visit adherence in this complex patient population.

Prior literature has identified potential characteristics that may be associated with clinic appointment attendance for people with SMI.¹⁶ Co-occurring psychiatric and substance abuse disorders are clinical characteristics in SMI individuals that have been associated with a high risk for treatment dropout.^{16–19} A diagnoses of schizophrenia (compared to other SMI diagnoses) has been associated with lower rates of treatment disengagement.¹⁶ Demographic information consistently associated with disengagement from mental health treatment in the literature includes younger age, being male and being a member of a minority population.^{16–21} In addition, social functioning factors, such as low educational attainment, unemployment, low socioeconomic status, and social isolation have previously been found to be correlated with treatment dropout.^{16–21}

Social factors such as isolation and support are potentially modifiable as is health-related knowledge and factors related to care engagement. Knowing which patient sub-groups are most vulnerable to being sub-optimally engaged in care can help target interventions that can make a difference in these groups.

This analysis combined data from a clinical trial involving patients with SMI-DM receiving care in a primary care system and data from the electronic medical record in that same primary care system. Thus, this study provides a study sample and data to potentially assess which modifiable factors associate with visit adherence in these individuals. In addition, these findings inform on how interventions can address mobilizing supports and provide actionable information on how disease self-management could improve engagement and adherence. Thus, the general purpose of the present study is to assess characteristics that may predict outpatient appointment attendance in outpatient medical clinics among patients comorbid for SMI-DM.

In particular, we evaluate which clinical characteristics, as determined by expert-knowledge and a literature search, associate with visit adherence via electronic medical records in DM-SMI individuals in a sample of enrolled RCT patients from a safety-net hospital. We assess if the factors as discussed in prior literature in SMI individuals also associate with visit adherence in DM-SMI individuals. Further, we assess which additional characteristics may associate with visit adherence in these individuals. Identifying modifiable factors that

associate with visit adherence may help develop psychological interventions that can advance the care of people with serious mental illness and comorbid diabetes, a common chronic medical disease.

METHODS

Overall Analysis Methods

This analysis investigates the relationship between variables affecting adherence to clinic appointment attendance among SMI-DM patients receiving care in a large safety net medical system. In order to determine the pool of variables potentially related to visit adherence for this study, an expert team of specialists (psychiatrists, psychologists, physicians and sociologists) was convened who, informed by available evidence, developed a priori hypotheses about which characteristics may be associated with clinical appointment attendance. The expert derived variables were grouped under conceptual categories by the team and included: demographic variables; disease knowledge; self-efficacy; social support; drug abuse; physical health factors; and mental health factors. We examined each of these characteristics separately for association with adherence, and then evaluated across characteristics for association with adherence. As illustrated in Figure 1, clinic appointment attendance was assessed retrospectively (“look back” analyses) by measuring whether research subjects in an RCT (intervention group and control group) attended scheduled outpatient clinic appointments (show or no show) in the primary care system over a period of two years prior to the date of baseline enrollment in the RCT (different for each individual ranging from January 2012 to April 2014). For the control group only, clinic appointment attendance was calculated for the period up to November 2015 following the RCT start date (prospectively). The outcome for clinical appointment attendance was evaluated in the combined 300 observations for the 2 time periods (retrospective and prospective). Patients in the intervention group were excluded from the prospective portion of the analysis since they were being actively encouraged to attend sessions as part of the intervention.

The preponderance of outpatient appointments scheduled for these patients at the safety net system (90%) were in non-mental health clinics. Most patients (54%) received their psychiatric care elsewhere, generally at community mental health clinics.

Participants and Procedures

Participants included 200 persons enrolled in an NIMH-funded study designed to test a novel intervention, Targeted Training in Illness Management (TTIM), vs. treatment as usual (TAU) among individuals with SMI and comorbid diabetes.²² The RCT was conducted in a safety-net health system primary care setting.

Inclusion criteria included having a diagnosis of schizophrenia, bipolar disorder or major depression confirmed with the Mini-International Neuropsychiatric Interview (MINI)²³ and receiving treatment for schizophrenia, bipolar disorder or depression; having diabetes based upon either previous diagnosis or laboratory values; being 18 years of age.

Measures

All subjects (TTIM and TAU) received a comprehensive baseline assessment on variables relevant to patients with SMI-DM. Demographic measures for this SMI-DM sample included sex, age, race, type of health insurance (Medicaid vs. all other types) and smoking status ever (yes or no). Additionally, the RCT included a number of standardized measures.

Depression was measured using the Montgomery Asberg Depression Rating Scale (MADRS) designed to be sensitive to change, widely utilized in studies with SMI patients and has strong validity and reliability.^{24,25}

Global psychiatric symptom severity was measured using the Brief Psychiatric Rating Scale (BPRS)²⁶, a widely used, relatively brief scale that measures major psychotic and non-psychotic symptoms in individuals with SMI.

Functional level was measured using the Global Assessment of Functioning Scale (GAF) that measures global functioning of psychiatric patients and is widely utilized in clinical studies involving SMI patients.²⁷

The Short Form (36) Health Survey is a survey of patient health.²⁸ The SF-36 consists of 8 scaled scores, which are the weighted sums of the questions in each section. Two of the summary components represent physical health (PHC) and mental health (MHC).

Diabetes control was evaluated with hemoglobin A1c which gives an indication of relative blood glucose levels over the previous 3 months.

The self-report Charlson comorbidity index (CCI) is a widely used comorbidity index²⁹ developed to predict the one-year mortality based on comorbidity data obtained from a hospital chart review.³⁰ It contains 19 comorbidities including diabetes with diabetic complications each of which was weighted according to their potential influence on mortality. There are limited data on the self-rated version of the CCI in persons with SMI. However, there is no reason to assume patients would not report with reasonable accuracy.^{29,30}

The Michigan Diabetes Research and Training Center designed a valid and reliable, brief diabetes knowledge test³¹ that has 2 components: a 14-item general test and a 9-item insulin-use subscale. Health literacy was assessed with a measure utilized to identify persons with limited health literacy in primary care.³² For our analyses, we summed the 3 subscales (functional, communicative, and reverse coding of critical health literacy) for a single score.³³

Social support was measured using the Multidimensional Scale of Perceived Social Support³⁴ which measures how one perceives their social support system, including an individual's sources of social support (ie family, friends, and significant other).

Self-efficacy for DM was measured using the Perceived Diabetes Self-Management Scale (PDSMS)³⁵, a diabetes-specific adaptation of the Perceived Medical-Condition Self-Management Scale. The PDSMS is a valid measure of diabetes self-efficacy. The generic

template from which it was adapted can be modified for use with other chronic medical conditions.³⁵ Self-efficacy for SMI was measured with a modification of this template for SMI patients, the Perceived Mental Health Self-Management Scale (PMHSMS), which was constructed for use in this study.

Drug Abuse Screening Test (DAST-10) is a short screening tool that can be either self-administered or administered by a clinician to assess drug use, excluding alcohol and tobacco, in the past 12 months.³⁶ Due to sparse cell counts in our sample for each total score greater than zero on the DAST-10, we use a binary measure in our analyses (zero or greater than zero). Thus, the interpretation of our dichotomized DAST-10 is if the subject had at least a low level problem of drug abuse vs. no problem.

Setting and Service Use

All primary care, specialty care and psychiatric care appointments were counted in defining our clinic appointment attendance outcome. Ninety percent of patients used the safety net system primarily for their general medical and specialty medical care, but only 46% received their psychiatric care there. The rest generally received care at community mental health centers. Clinic appointment attendance was defined as the number of clinic appointments attended (numerator) out of the total number of clinic appointments scheduled (denominator).

Overall, the average rate of attending scheduled appointments was very similar both retrospectively for the combined TAU and TTIM samples (77%) and prospectively in the TAU group (75%). The total number of clinic appointments over the two sampled periods varied considerably by individual in both the retrospective (min = 1.0, max = 205.0, mean = 46.6, median = 39.0, 1st quartile = 16.0, 3rd quartile = 70.0) and prospective samples (min = 1.0, max = 365.0, mean = 83.0, median = 73.0, 1st quartile = 29.0, 3rd quartile = 115.0).

Expert –derived adherence-associated groupings

Figure 2 depicts the specific measures grouped into each of the expert derived groupings.

Analysis Plan

Descriptive statistics for baseline covariates under study and clinic appointment show rate were reported in Table 1 by treatment arm. Since we did not expect our analyses to be influenced by missing values for any of the covariates (less than 5% missing on any particular covariates) we performed listwise deletion.

A series of multivariate generalized estimating equations (GEE) with logit link functions were used to examine which individual grouped characteristics (for individual variables for each grouped characteristic for each multivariate model see Figure 2) were associated with clinic appointment attendance.³⁷ This marginal modeling approach accounts for within-subject correlation. TAU subjects had 2 time periods (retrospective and prospective) while TTIM subjects only had one time period (retrospective).

We controlled for a time effect (retrospective or prospective) in each model in order to adjust for any time differences. We tested interaction terms between time effect and each covariate.

We removed interactions for each grouped characteristic that were not significant and adjusted for those that were statistically significant. Multivariate analyses using a similar GEE approach were also performed for adjusting the model across the grouped characteristics. Individual variables from the previous series of multivariate models with a p-value $\leq .10$ were selected for inclusion in this final analyses.

RESULTS

Forty-eight percent of participants had a diagnosis of major depression, 27% bipolar disorder and 25% schizophrenia. Mean age was 54.0 years (SD 9.4); 64% were female; and 53% African-Americans. All participants had a diagnosis of DM. At baseline there were no clinically important differences between arms of the trial (TTIM vs TAU) as measured by standardized absolute mean differences (see Table 1).

In the multivariate variable models for each grouped characteristic, individual variables significantly associated with increased clinical appointment attendance included, older age, higher self-efficacy for mental health issues, higher levels of global functioning and less severe global psychiatric symptoms. Increased diabetes knowledge and no reported problem of drug abuse were also associated with increased clinical appointment attendance (see Figure 3). African-American and Other race (vs. Caucasian race) and SMI diagnosis of bipolar disorder and schizophrenia (vs. depression) were significantly associated with decreased clinical appointment attendance. Figure 3 visually showcases the results of these multivariate models separated by grouped characteristics in a Forest plot.

In the final multivariate model allowing for adjustment across grouped characteristics (Table 2), predictors associated with increased clinical appointment attendance (using a significance criterion of $p \leq .10$) included older age, increased psychiatric patient functioning and less psychotic symptoms. Predictors associated with decreased clinical appointment attendance (using a significance criterion of $p \leq .10$) included African-American and Other race (vs. Caucasian) and SMI diagnosis of bipolar disorder (vs. depression).

DISCUSSION

Adherence to scheduled visits is integral to the process of care planning and engagement; the best designed treatment plans are wasted if patients fail to participate in treatment. In this analysis using data from a well-characterized research sample combined with electronic medical record data, we identified patient characteristics that were associated with clinic no-show rates among people with SMI-DM. A unique feature of the analysis was inclusion of variables known to be critical to self-management of both SMI and DM concurrently, such as depression, DM knowledge and self-efficacy. While demographic, symptoms severity and comorbidity predictors are similar to previous work on mental health treatment adherence, findings on self-efficacy appear novel.

This study, in which most of the clinic visits were not for psychiatric care, explored the understudied, important issue of factors related to adherence to medical appointments in patients comorbid for a serious mental illness and a chronic medical condition. This study

expands these findings, utilizing a larger sample, SMI patients comorbid for diabetes, and a variety of demographic, psychiatric and psychosocial variables.

Consistent with other research on mental health adherence, demographic variables that are related to poor adherence include age and minority ethnicity. The finding that non-Caucasian race is related to lower adherence is consistent with other reports that show minorities at risk for non-adherence.^{38,39} African-Americans with SMI-DM might need more intensive approaches to help maximize care engagement. It might be expected that individuals who are older may learn, over time, that keeping clinic appointments is helpful in managing their health. However, it is also possible that analysis findings may reflect a “healthy survivor” effect and older individuals in our sample were those who have been able to self-manage sufficiently to keep clinic appointments and survive at least into middle age.

Psychiatric diagnosis, psychiatric symptom severity and comorbidity were all also associated with show rates in this analysis. Having a bipolar diagnosis compared to a depression diagnosis was associated with no-shows. Previous studies on mental health adherence have found very poor treatment adherence in bipolar patients.⁴⁰ Poor adherence to outpatient appointments by SMI-DM patients receiving medical care at a safety net hospital was related to the severity of global psychiatric symptoms as exemplified in elevated BPRS scores. Similar to findings by other investigators on mental health adherence⁴¹, having no reported drug problem in our sample was also associated with improved visit adherence. This finding underscores the importance of screening and assessing substance use in people with SMI. In our sample, having poorer physical health was not associated with individuals having higher attendance rates for clinical appointments. This contrasts with some studies that found adherence is worse among SMI patients with more medical comorbidity.⁴² It is possible that the self-reported Charlson, which is designed to focus on medical conditions that are most relevant to mortality risk, may have provided an insufficient determination of day-to-day medical burden experienced by individuals with SMI-DM.

In this analysis having less knowledge about diabetes was associated with poorer adherence. This is consistent with what has been observed with medication adherence.⁴³ Diabetes education is a cornerstone of DM treatment. However, education also needs to be followed up with including nutritional management, physical activity, medication management, glucose monitoring, and psychosocial adjustment to the stress of having a serious chronic medical condition.⁴⁴ Treatment requires awareness of diabetes achieved via education for day-to-day knowledge and sufficient care engagement to manage nutrition, exercise, lifestyle monitoring and medication.⁴⁴

Self-efficacy is a psychological variable which may influence people’s behavior. As a result, self-efficacy can help determine perception of being able to adhere to primarily medical visits. Motivation to follow through on scheduled visits may follow higher levels of self-efficacy. Previous studies^{45–47} found that low perceived self-efficacy was associated with nonadherence to health recommendations in chronic patients.

The literature on the relationship between self-efficacy and SMI-DM adherence is limited. In this analysis, higher levels of self-efficacy were also associated with better visit adherence.

To the best of our knowledge, this is the first report of the relationship between self-efficacy and adherence to primarily medical visits for individuals with SMI-DM. Self-efficacy is potentially modifiable with well-designed psychological interventions.

This study has important strengths including the fact that we assessed *both* a physical health and mental health condition to understand characteristics associated with visit adherence. In addition to standard RCT data collection, we link most individuals in the RCT to an electronic medical record registry within our safety net hospital. This yielded the highly detailed clinical information typical in a research sample with real-world information on how individuals with SMI-DM manage complex comorbidity. An additional strength is that we used a generalized estimating equations approach that allowed us to design our study to minimize trial confounding in the intervention group.

This study also has several limitations. In this analysis using research trial data and retrospective record review, attendance rates were similar. A multivariate model was used that controlled across the grouped characteristics under study. However, due to the sample size, these results should be viewed as exploratory and further refinement may still be necessary. Another limitation for this study is that all conclusions are based on a select group of SMI-DM individuals who were able and willing to participate in a controlled trial. A further limitation is that clinic appointments at only one medical system were recorded for this study. Patients may have had appointments for medical and specialty care at other care systems, although this was likely not common given the fact that many individuals use the care system due to having few other resources for general health care. Approximately half of the patients did report that they received their psychiatric care elsewhere. This is not surprising since many utilize community mental health clinics for their mental health needs.

In conclusion information on clinical and demographic characteristics and factors potentially modifiable by psychological interventions may be useful in improving adherence to treatment among patients comorbid for serious mental illness and diabetes, a common chronic medical disease. Future studies are necessary for reproducibility in other DM-SMI populations in other settings. More research is needed to further clarify what factors are predictive of poor adherence and tailor adherence facilitating interventions among a subgroup at particular risk for non-adherence.

Conclusions

Adherence to medical appointments in the mental health field is an understudied, important issue for clinicians, healthcare systems, and other stakeholders. No-shows waste resources, are highly prevalent, and are associated with poor health outcomes. Further, adherence to scheduled clinic appointments is particularly important for patients with serious, comorbid, chronic medical and mental health conditions since attendance is critical in facilitating appropriate treatment planning and care coordination. In the current study, we evaluated the relationship between variables affecting adherence to clinic appointment attendance among individuals with type 2 diabetes and a serious mental illness receiving care in a large safety net medical system.

Information on clinical and demographic characteristics and factors potentially modifiable by psychological interventions may be useful in improving adherence to treatment among patients comorbid for serious mental illness and diabetes, a common chronic medical disease. In our DM-SMI sample, we have identified lower levels of disease knowledge and self-efficacy, higher levels of drug abuse, SMI diagnoses of bipolar disorder (compared to depression) and lower levels of global functioning and more severe global psychiatric symptoms as potentially modifiable factors with an association with lower clinical appointment attendance. While some of these factors have been associated with lower attendance of SMI patients for psychiatric care, in this study most patients received their psychiatric care elsewhere. The preponderance of the visits studied were scheduled in medical clinics. Medical clinic staff are less likely to fully understand and take into account the cognitive and motivational limitations of SMI patients. For example, while DM education is routinely provided, SMI patients may need an education program that is tailored to their cognitive level of functioning. Psychiatric symptom severity, the presence of mania and substance abuse are complex phenomena that interact with each other. Medical staff could likely benefit from training materials that explain these interactions and their potential impact on adherence to DM care.

This preliminary study underscores the need for more research on the interaction of psychiatric functioning and adherence to DM treatment in SMI patients where comorbid DM is common. In particular, to our knowledge, this is the first study to report on the association between self-efficacy and adherence to primarily medical visits for these individuals. The relationship between low self-efficacy for mental health problems and attendance at these largely medical appointments suggests that not only the severity of mental health problems but also the SMI patient's perception of their ability to self-manage their health effects adherence to DM care. This finding suggests the need for more research on psychosocial factors on medical adherence among people with SMI.

Interestingly, physical health measures did not significantly associate with visit adherence. Further research is needed to clarify this finding. Future studies are also necessary for reproducibility in other DM-SMI populations in other settings. It is our hope that clinicians and researchers will use these results to help tailor adherence facilitating interventions among people at particular risk for poor engagement in care.

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Human Subjects Statement

Data included in this manuscript were obtained under the MetroHealth IRB # 11-00561: Targeted Training in Illness Management for patients with Severe Mental Illness (SMI) and Diabetes Mellitus (DM). This IRB approval was used to acquire our data for a secondary data analyses of randomized clinical trial participants for this manuscript. The data analyses involved routinely-collected electronic health information captured from electronic health records at MetroHealth by database administration personnel responsible for maintaining the registry using HIPAA compliance procedures.

Trial registration number: NCT01410357

Registry web address: <https://clinicaltrials.gov/show/NCT01410357>

Figure 1. Analyses Plan Sample Flow Chart

Note.

Green, solid arrows show aggregate retrospective “look-back” and prospective samples used for this analyses (N=200 with 300 total observations). Orange, dotted arrows indicate patients randomized to the intervention arm of the RCT and thus not appropriate for the prospective portion of the analyses.

Figure 2. Grouped Characteristics Potentially Associated with Clinic Appointment Attendance – Expert Derived

Note.

SMI = Serious Mental Illness; PDSMS = Perceived Diabetes Self-Management Scale; PMHSMS = Perceived Mental Health Self-Management Scale; MSPSS = Multidimensional Scale of Perceived Social Support; DAST = Drug Abuse Screening Test; CCI = Charlson Comorbidity Index; GAF = Global Assessment of Functioning; MADRS = Montgomery Asberg Depression Rating Scale; BPRS = Brief Psychiatric Rating Scale.

Figure 3. Forest Plot of Measures Potentially Associated with Clinic Appointment Attendance in Multivariate Models Separated by Grouped Characteristics (N=200 with 300 Observations Used) Note.

SMI = Serious Mental Illness; PDSMS = Perceived Diabetes Self-Management Scale; PMHSMS = Perceived Mental Health Self-Management Scale; MSPSS = Multidimensional Scale of Perceived Social Support; DAST = Drug Abuse Screening Test; CCI = Charlson Comorbidity Index; GAF = Global Assessment of Functioning; MADRS = Montgomery Asberg Depression Rating Scale; BPRS = Brief Psychiatric Rating Scale.

Table 1

Clinical Characteristics of Individuals with SMI and DM Participating in Targeted Training in Illness Management (TTIM) Vs Treatment as Usual (TAU)

Variable	All individuals N= 200	TTIM N= 100	TAU N= 100	SAMD
DEMOGRAPHICS				
Age (mean, SD)	52.7, 9.5	52.8, 9.7	52.6, 9.7	.021
Gender Female (N, %)	128 (64.0%)	63 (63.0%)	65 (65.0%)	.050
Race (N, %)				
-Caucasian	74 (37.0%)	38 (38.0%)	36 (36.0%)	.001
-African-American	107 (53.5%)	52 (52.0%)	55 (55.0%)	.001
-Other	19 (9.5%)	10 (10.0%)	9 (9.0%)	.010
Hispanic (N, %)	17 (8.5%)	10 (10.0%)	7 (7.0%)	.030
Education (mean years, SD)	12.6, 2.7	12.7, 2.5	12.5, 2.9	.074
Health Insurance (N, %)				
-Private	7 (3.5%)	5 (5.0%)	2 (2.0%)	.026
-Medicare	69 (34.5%)	35 (35.0%)	34 (34.0%)	.001
-Medicaid	95 (47.5%)	48 (48.0%)	47 (47.0%)	.000
-Other/none	29 (14.5%)	12 (12.0%)	17 (17.0%)	.015
CLINICAL CHARACTERISTICS				
SMI Diagnosis				
Schizophrenia	49 (24.5%)	29 (29.0%)	20 (20.0%)	.009
Bipolar Disorder	56 (28.0%)	22 (22.0%)	34 (34.0%)	.009
Major Depressive Disorder	95 (47.5%)	49 (49.0%)	46 (46.0%)	.001
SMI duration (mean years, SD)	18.5, 12.6	19.1, 12.9	17.8, 12.4	.103
DM duration (mean years, SD)	10.1, 7.8	9.8, 7.5	10.3, 8.1	.064
AHA-defined HTN (N, %)	87 (43.5%)	45 (45.0%)	42 (42.0%)	.001
Insulin user (N, %)	88 (45.4%)	43 (44.3%)	45 (46.4%)	.001
Charlson Index (mean, SD)	2.24, 1.6	2.35, 1.7	2.13, 1.5	.137
BHLS (mean, SD)	12.46, 3.2	12.5, 3.0	12.4, 3.3	.022
SMI SYMPTOM SEVERITY, FUNCTIONAL STATUS, GENERAL HEALTH, PHYSICAL BIOMARKERS				
CGI (mean, SD)	4.3, 0.9	4.3, 1.0	4.3, 0.9	.000
MADRS (mean, SD)	24.1, 9.1	23.1, 9.4	25.0, 8.8	.209
BPRS (mean, SD)	40, 9.3	38.7, 9.8	41.3, 8.9	.278
GAF (mean, SD)	51.6, 11.5	51.8, 11	51.4, 11.9	.035
Sheehan Disability (mean, SD)	17.9, 6.2	18.0, 5.8	17.8, 6.5	.033
SF-36 (mean, SD)				
-Physical	39.6, 10.5	39.4, 10.1	39.8, 10.9	.038
-Mental	36.4, 11.4	37.2, 10.6	35.6, 12.1	.141
HbA1c (mean, SD)	8.2, 3.0	8.2, 2.0	8.0, 2.4	.091

Variable	All individuals N= 200	TTIM N= 100	TAU N= 100	SAMD
Systolic BP (mean, SD)	134.8, 21.2	135.0, 20.7	134.5, 21.7	.024
BMI (mean, SD)	36.0, 8.7	35.4, 8.0	36.6, 9.4	.138

Note.

SMI= Serious mental illness, DM= Diabetes mellitus, AHA = American Heart Association, HTN= hypertension, Charlson Index= Charlson comorbidity index, BHLS= Basic Health Literacy Scale, CGI = Clinical Global Impression, MADRS = Montgomery Asberg Depression Rating Scale, BPRS= Brief Psychiatry Rating Scale, GAF= Global Assessment of Functioning, Sheehan Disability= Sheehan Disability Scale, SF-36 = Short-form 36 (general health status), HbA1c= glycosylated hemoglobin, BMI= Body Mass Index, SAMD= standardize absolute mean difference. Source: David B Wilson, George Mason University. <http://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD1.php> [online effect size calculator]

Table 2

Measures Potentially Associated with Clinic Appointment Attendance in Multivariate Analyses Across Grouped Characteristics

Variable	Odds Ratio (95% CI)	p
Time		
Phase (ref retrospective)	1.03(.85, 1.23)	.794
Demographics		
Age (per Decade)	1.02(1.01, 1.03)	.006
Race (ref White)		
African American	.62(.43, .88)	.008
Other	.62(.37, 1.03)	.064
Disease Knowledge		
Diabetes Knowledge (per 10 units)	1.03(.96, 1.10)	.372
Self Efficacy		
PMHSMS (per 5 units)	1.08(.96, 1.21)	.195
Drug Abuse		
DAST (> 0 vs = 0)	.88(.61, 1.26)	.475
Mental Health		
SMI Diagnoses (ref Depression)		
Schizophrenia	.85(.62, 1.16)	.301
Bipolar	.67(.46, .97)	.033
GAF (per 5 units)	.95(.89, 1.01)	.100
BPRS (per 5 units)	.92(.85, .99)	.030

Note.

SMI = Serious Mental Illness; PDSMS = Perceived Diabetes Self-Management Scale; PMHSMS = Perceived Mental Health Self-Management Scale; MSPSS = Multidimensional Scale of Perceived Social Support; DAST = Drug Abuse Screening Test; CCI = Charlson Comorbidity Index; GAF = Global Assessment of Functioning; MADRS = Montgomery Asberg Depression Rating Scale; BPRS = Brief Psychiatric Rating Scale.