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A preliminary analysis of individuals with serious mental illness and comorbid diabetes

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Abstract

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Objective—To understand factors related to managing illness in older individuals with serious mental illness (SMI)

Methods—Baseline data from 200 individuals with SMI and diabetes enrolled in a study were used to compare characteristics between older (> age 55) vs. younger (≤ age 55) individuals

Results—Older individuals had better diabetes control compared to younger individuals, those with major depressive disorder had diabetes for a longer duration, worse diabetic control, and more emergency department encounters.

Conclusions—Helping younger individuals with SMI learn to manage their mental and physical health early-on might minimize the negative and cumulative effect of diabetes.

Keywords

older adults; serious mental illness; diabetes; self-management

Introduction

Metabolic disorders, such as diabetes, are rapidly growing problems among Americans. The Centers for Disease Control and Prevention (CDC 2014) notes that in 2012, 29.1 million children and adults in the United States or 9.3% of the population have diabetes, and in 2012 alone there were 1.7 million new cases of diabetes in people aged 20 years and older. High rates of comorbid medical illnesses are found in adults with psychotic disorders including schizophrenia and schizoaffective disorder and adults with affective disorders including depression and bipolar disorder. (Dickey et al. 2002). A sub-group of individuals at particular risk for metabolic disorder including diabetes is individuals with serious mental illness (SMI), such as schizophrenia, bipolar disorder and severe or recurrent major depression (Barnett 2007). There are a variety of factors that contribute to the higher rates of diabetes in people with SMI, including poor diet, inactivity and the effects of psychotropic drugs (Daumit et al., 2005; Dipasquale et al., 2013, Jerome et al., 2009).

Unfortunately, people with SMI have elevated rates of premature mortality due to these comorbidities (Hannerz, 2001, Walker 2015). Older adults with SMI are known to have high rates of diabetes and die earlier than the general population. Medical illness in older persons with SMI is associated with early mortality, disability, reduced functioning, and greater rates of nursing home placement and high-cost emergency services (Bartels 2004). Understanding factors related to managing physical and mental health in older people with SMI could help inform better treatments that may improve outcomes. This analysis of baseline data from a randomized controlled trial (RCT) testing a novel behavioral intervention intended to improve mental and physical health in people with SMI, assessed clinical characteristics of older (> age 55) vs. younger (≤ age 55). Additionally older adults with MDD, BD and SZ were compared on healthcare use in the past 2 years.

Methods

Overview

This analysis used baseline data from 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 (1R01MH085665-01A2). The study is a randomized controlled trial (RCT) that enrolled 200 individuals in a safety-net health system primary care setting. Primary outcomes in the overall study include SMI symptoms and diabetes outcomes (HbA1c levels). Secondary outcomes include other dimensions of mental and general health, such as disability, alcohol abuse, diabetes knowledge, social support, insight and body mass index (BMI). In this analysis, older individuals (> age 55 years) with schizophrenia/schizoaffective disorder (SZ), bipolar disorder (BD) or major depressive disorder (MDD) + diabetes were compared to younger individuals (≤ 55years) on clinical and demographic characteristics. Within the older patient sample, diagnostic subgroups (MDD, BD, SZ) were compared with respect to clinical characteristics and hospital and emergency department (ED) use.

Participants

The RCT inclusion criteria included: having a diagnosis of SZ, BD or MDD confirmed with the Mini-International Neuropsychiatric Interview (Sheehan, et al., 1998) and receiving treatment for SMI; having diabetes based upon previous diagnosis or laboratory values; being ≥ 18 years of age; able to communicate in English; and able to provide written, informed consent to participation. Individuals with guardians of person provided guardian consent and patient assent. Exclusion criteria included: being actively suicidal/homicidal; being unable to be rated on study rating scales; having dementia; being pregnant; being unable to participate in groups due to uncontrolled/severe psychiatric symptoms; limited expected lifetime; being unable to provide informed consent; having special physical and/or dietary needs that are not consistent with the TTIM Intervention; or participation in another RCT that affects diabetes or mental health outcomes. The study was approved by the local institutional review board (IRB). Study participants were recruited from clinician and community referrals, word of mouth and self-reported referrals in response to IRB-approved advertisement, and via electronic health record search for having SMI on medical problem list.

Measures

Table 1 shows baseline demographic and clinical variables between older and younger individuals with SMI. Health literacy assessment used screening questions evaluated by Wallace (2006) to detect persons with limited or marginal health literacy in primary care settings. Diabetes control was evaluated with HbA1c, which gives an indication of relative blood glucose control over the previous 3 months. Body Mass Index (BMI), a known risk factor for diabetes, was recorded. The self-reported Charlson Index evaluated the presence of significant medical comorbidity (Chaudhry, Jin, &Meltzer. 2005). In addition the following standardized measures were used:

Psychiatric Symptoms

Montgomery Asberg Depression Rating Scale (MADRS)

The MADRS is a 10-item depression severity scale sensitive to change, widely utilized in studies with patients with SMI, and has established strong validity and reliability (Montgomery and Asberg, 1979; Sajatovic and Ramirez, 2003). Higher scores indicate greater depression severity.

Brief Psychiatric Rating Scale (BPRS)

The BPRS (Overall & Gorham, 1962), is a widely used scale that measures major psychotic and non-psychotic symptoms in SMI. Higher scores indicate greater symptom severity.

Functional Status/Disability

Global Assessment of Functioning (GAF)

The GAF is a 100-point single-item scale that measures global functioning of psychiatric patients, and is widely used in SMI studies (Jones, Thornicroft, Coffey, & Dunn, 1998). Higher scores indicate better functioning.

Sheehan Disability Scale (SDS)

Related to functional status, the SDS measures role impairment associated with mental disorder (Leon, Olfson, Portera, Farber, & Sheehan, 1997). Higher scores indicate greater disability.

Other Standardized Measures

Diabetes Knowledge was assessed with the Brief Diabetes Knowledge Test, a 14-item instrument that is reliable, valid and has been used successfully with people with SMI (McKibbin et al., 2006; Fitzgerald et al. 1998). Higher scores indicate greater diabetes knowledge.

Insight into Mental Illness was evaluated with the Insight and Treatment Attitudes Questionnaire (ITAQ), an 11-item rating scale to evaluate patient recognition of illness and need for treatment in psychiatric illness (McEvoy, 1998). Higher scores indicate less insight.

Alcohol abuse was measured with the CAGE questionnaire, a widely used method of screening for lifetime risk for alcohol use disorders (Ewing, 1984). Higher scores indicate higher risk for problem drinking.

Drug Abuse was measured with the Drug Abuse Screening test 10-item version (DAST-10), which identifies severity of drug dependence consistent with the concept of the drug dependence syndrome (Skinner, 1982). Higher scores indicate more problems with drug use.

Social Support was measured with the Multidimensional Scale of Perceived Social Support (MSPSS), a self-report measure of subjectively assessed social support (Zimet et al., 1990). Higher scores indicate higher levels of perceived social support.

Data Analysis

Analyses were conducted in SAS software version 9.2 (SAS Institute 2008) and R software version (The R Foundation for Statistical Computing 2014) for 64-bit Windows operating system. Descriptive statistics for baseline measures under study were reported in Table 1 for comparisons between older and younger individuals and in table 2 for comparisons among SMI categories in older individuals. Continuous and ordinal variables were analyzed using Wilcoxon test in Table 1 and Kruskal-Wallis test in Table 2. Categorical variables were analyzed using Chi-square test in Table 1 and Table 2. The level of significance in all statistical tests except where noted otherwise was defined as $\alpha = 0.05$. Given the limited data on trajectories of care with aging in SMI, the older adult sample was assessed with respect to healthcare use patterns in the 2 years prior to study enrollment. The electronic health record was evaluated for hospitalizations (discharge diagnosis and length of stay in days), and emergency room visits.

Results

Analysis of Older vs. Younger people with SMI

As noted in Table 1, which illustrates demographic and clinical characteristics of older (> 55 years) vs. younger (≤ 55 years) individuals with SMI, there were more similarities than differences except for the expected factors of duration of illness and proportion of individuals on Medicare. Older individuals were slightly better educated. There were no significant differences in gender, race/ethnicity or SMI symptoms. There were no differences detected in health literacy between the younger and older groups. In spite of having more medical comorbidity, older individuals had significantly better diabetes control.

Older people with MDD, BD and SZ

Table 2 illustrates selected clinical characteristics and healthcare use in older adults with SMI. There were no differences in health literacy between the SMI groups. Older adults with MDD included a higher proportion of women, were slightly older and had diabetes for longer duration. Older adults with SZ had more severe global psychiatric symptoms. Diabetes control was worst in older adults with MDD and use of the ED was also highest in this group. Table 3 illustrates the top hospital discharge diagnoses among older adults with SMI and comorbid diabetes. Mood disorder was the only condition that made it into the top reason for hospitalization across all the 3 groups, while other top reasons for hospitalization in at least 2 of each psychiatric sub-group were for COPD, CHF, chest pain, pancreatitis and diabetes.

Discussion

In this well characterized sample with SMI and comorbid diabetes, older vs. younger individuals have more similarities than differences on demographic and psychosocial variables as well as psychiatric symptoms. However, in spite of greater cumulative medical burden, diabetes control appears better in older individuals compared to younger individuals. It is not clear if differential diabetes control in older people is related to better self-management, survivor effects, or other reasons, although our analysis of diagnostic sub-

groups within the older sample support the importance of education, mood symptoms and duration of diabetes as highly relevant to health outcomes.

Among older people with SMI, most demographic and clinical variables are also similar when comparing these variables among individuals with SZ, BD and MDD. Older individuals with MDD in this sample had diabetes for a longer duration, worse diabetic control, and more use of the ED. While medical complications related to medical burden and diabetes is common in older adults with SMI, mood disorder, specifically depression, remains a key driver of ED use. Razzano, et al. (2014) recently examined the prevalence and treatment of 17 co-occurring physical health conditions among 457 adults with SMI in 4 U.S. states. Compared to the U.S. population, among those with SMI, prevalence was significantly higher for 14 out of 17 medical conditions assessed. Diabetes was present in 21%, and was included in the “top 5” list of most common comorbidities that also included hyperlipidemia, hypertension, asthma and arthritis. Controlling for age, study site, and Medicaid status, racial/ethnic minorities were almost twice as likely as Caucasians to be diagnosed with hypertension and diabetes and women were almost twice as likely as men to be diagnosed with diabetes. Clearly, among those with SMI, medical comorbidity is the rule rather than the exception, and individuals with SMI include minorities with socioeconomic or other challenges that make health self-management more difficult.

Our findings have clinical implications with respect to how Psychiatric Mental Health Advanced Practice Nurses (PMH-APRNs), with their skills in advanced health assessment, pathophysiology, and pharmacology, can work to improve what would otherwise be a bleak prognosis for people with SMI and physical comorbidity. They can play a potentially important role in mediating the harmful effects of having a chronic physical disorder among individuals with SMI by helping individuals with SMI learn to manage their mental and physical health early-on to minimize the cumulative negative effects of diabetes. Although it is encouraging to see that some individuals survive into older age and learn to manage their health, it is possible that PMH-APRN led programs could be particularly helpful to people newly diagnosed with diabetes and SMI as they learn to master the skills needed to manage blood sugar, diet, and the host of health behaviors required for optimal self-management. Finally, how self-management for people with SMI fits into the overall schema of integrated healthcare needs to be clarified. In spite of the fact that chronic disease self-management has been translated into multiple settings over the last 2 decades (Lorig, 2015), formal self-management approaches for individuals with SMI and diabetes are not a standard of care in most clinical settings. Older SMI survivors who have learned to manage their diabetes, are a potential strength and talent pool that has been under-used. Perhaps a partnership involving PMH-APRNs and older Peer Educators with both SMI and diabetes could be an opportunity to teach and support individuals with these same chronic diseases across the life-span.

This study had a number of limitations including a relatively small sample, single-site setting and cross-sectional design. Longitudinal and qualitative data assessments being analyzed in this study may provide additional future insight into the critical elements of SMI and diabetes co-management. Additionally, whereas linear regression analyses can be used to address the question of whether age is generally an important predictor of diabetes control in individuals with SMI, it cannot answer the important question of whether the association

between diabetes control and age holds true across the entire spectrum of diabetes control (i.e. lower vs. higher levels of HbA1c). In addition to this preliminary analysis, a more comprehensive picture of the relationship between HbA1c and age might be obtained by using analysis techniques, such as quantile regression, (Marrie, Dawson, & Garland, 2009; Burgette, Miranda, & Reiter, 2011) and avoiding subgroups defined by one variable at a time (Wagner, Balk, Kent, Kasiske, & Ekberg, 2009). These types of analyses are in the process of being implemented by this study team.

In conclusion, diabetes is common in individuals with SMI, negatively impacts health, and may take skill and time to optimally manage. Those people who don't learn to control their diabetes early on, do not live into older age. Self-management approaches that tap into the skills of older people who have learned to successfully cope, could be helpful to care teams planning and implementing programs to help individuals with SMI and comorbid diabetes.

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Table 1

Demographic and clinical characteristics of older vs younger individuals with SMI and comorbid diabetes

Variable	Older individuals n= 106	Younger individuals n=94	Statistic** p-value
Age	61.94 (5.1)	47.33 (6.7)	<.01
Education in years	12.85 (2.6)	12.28 (2.8)	0.02
Gender, Female	68 (53.1%)	60 (46.9%)	0.96
Race			
White	44 (59.5%)	30 (40.5%)	
African-American	54 (50.5%)	53 (49.5%)	
Other	8 (42.1%)	11 (57.9%)	0.30
Insurance Status			
Private	5 (71.4%)	2 (28.6%)	
Medicare	45 (65.2%)	24 (34.8%)	
Medicaid	44 (46.3%)	51 (53.7%)	
No Insurance	12 (41.4%)	17 (58.6%)	0.05
Duration of SMI in Years	21.58 (13.7)	14.95(10.3)	<.01
Duration of Diabetes in Years	10.08 (7.5)	10.05 (8.1)	0.73
Psychiatric diagnosis			
Major Depression	30 (53.6%)	26 (46.4%)	
Bipolar Disorder	50 (52.6%)	45 (47.4%)	
Schizophrenia	26 (53.1%)	23 (46.9%)	0.99
Body Mass Index (BMI)	35.45 (7.3)	36.67 (10.1)	0.70
Charlson	2.49 (1.6)	1.96 (1.5)	0.01
Diabetes Knowledge	65.99 (20.8)	65.71 (18.6)	0.73
Hemoglobin A1c	7.51 (2.1)	8.53 (2.4)	<.01
MADRS	23.13 (9.4)	25.06 (8.8)	0.11
BPRS	39.43 (9.5)	40.65 (9.4)	0.39
GAF	51.95 (11.7)	51.23 (11.2)	0.84
SDS	17.69 (6.1)	18.06 (6.2)	0.72
ITAQ	17.49 (5.5)	17.25 (5.6)	0.78
CAGE	0.89 (1.5)	0.97 (1.6)	0.82
DAST-10	0.45 (1.6)	0.83 (2)	0.07

Variable	Older individuals n= 106	Younger individuals n=94	Statistic** p-value
MSPSS	40.89 (10.5)	41.86 (9.8)	0.51
Health Literacy	12.64 (3.05)	12.26 (3.27)	0.63

For all variables we present mean and standard deviation (SD) except for categorical variables for which we present n and percent (%)

Charlson= Self-reported Charlson Medical Comorbidity Index

BPRS= Brief Psychiatric Rating Scale

MADRS= Montgomery Asberg Depression Rating Scale

GAF= Global Assessment of Functioning

SDS= Sheehan Disability Scale

ITAQ= Insight and Treatment Attitudes Questionnaire

CAGE= CAGE Questionnaire for alcohol use

DAST-10: Drug Abuse Screening Test 10-item version

MSPSS= Multidimensional Scale of Perceived Social Support

** Continuous and ordinal variables analyzed using Wilcoxon test; categorical variables analyzed using Chi-square test

Table 2

Selected clinical characteristics and health resource use among older adults with SMI and comorbid diabetes

Variable	MDD n= 50	Bipolar Disorder n= 30	Schizophrenia n= 26	Statistic p-value
Age	63.06 (5)	61.6 (5.7)	60.19 (4.4)	0.04
Education in years	12.96 (2.3)	13.04 (2.5)	12.41 (3.3)	0.92
Gender, Female	39 (57.4%)	19 (27.9%)	10 (14.7%)	<0.01
Race				
White	24 (54.5%)	12 (27.3%)	8 (18.2%)	
African-American	22 (40.7%)	14 (25.9%)	18 (33.3%)	
Other	4 (50.0%)	4 (50.0%)	0 (0%)	0.14
Duration of SMI in years	19.92 (14.7)	20.07 (12.3)	26.5 (12.3)	0.08
Duration of Diabetes in years	12.3 (8.6)	7.93 (5.1)	8.19 (6.6)	0.03
Body Mass Index (BMI)	36.08 (7.3)	36.53 (7.6)	32.98 (6.8)	0.16
Charlson	2.34 (1.5)	2.8 (1.5)	2.42 (1.7)	0.33
Diabetes Knowledge	69.16 (19.5)	67.43 (21.7)	58.35 (21.1)	0.09
Hemoglobin A1c	7.91 (2.3)	7.55 (1.8)	6.73 (1.8)	0.04
MADRS	25.41 (8.3)	21.27 (8.3)	21 (11.5)	0.12
BPRS	38.84 (8.1)	36.4 (9.6)	44.08 (10.3)	0.01
Proportion with ED visits in previous 2 years	62.0 %	63.3%	30.8%	0.02
Proportion with hospitalizations* in previous 2 years	26.0%	23.3%	30.8%	0.82

For all variables we present mean and standard deviation (SD) except for categorical variables for which we present n and/or percent (%)

MDD= Major Depressive Disorder

Charlson= Self-reported Charlson Medical Comorbidity Index

BPRS= Brief Psychiatric Rating Scale

MADRS= Montgomery Asberg Depression Rating Scale

* ED and hospitalization are independent; for patients who are admitted through the ED, only the hospitalization is counted.

Table 3

Top reasons for hospital discharge among older adults with SMI and comorbid diabetes

Major Depressive Disorder N= 50	**Bipolar Disorder N= 30**	**Schizophrenia N= 26**
Chest Pain	Mood Disorders	Respiratory Failure
COPD	Pancreatitis	Pancreatitis
Mood Disorders	Chest Pain	Mood Disorders
Abdominal Pain	COPD	Diabetes
Diabetes	CHF	CHF

COPD= Chronic obstructive pulmonary disease

CHF= Congestive heart failure