

# Use of a Computerized Medication Shared Decision Making Tool in Community Mental Health Settings: Impact on Psychotropic Medication Adherence

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Received: 4 August 2011 / Accepted: 2 July 2012 / Published online: 27 July 2012  
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**Abstract** Healthcare reform emphasizes patient-centered care and shared decision-making. This study examined the impact on psychotropic adherence of a decision support center and computerized tool designed to empower and activate consumers prior to an outpatient medication management visit. Administrative data were used to identify 1,122 Medicaid-enrolled adults receiving psychotropic medication from community mental health centers over a two-year period from community mental health centers. Multivariate linear regression models were used to examine if tool users had higher rates of 180-day medication adherence than non-users. Older clients, Caucasian clients, those without recent hospitalizations, and those who were Medicaid-eligible due to disability had higher rates of 180-day medication adherence. After controlling

for sociodemographics, clinical characteristics, baseline adherence, and secular changes over time, using the computerized tool did not affect adherence to psychotropic medications. The computerized decision tool did not affect medication adherence among clients in outpatient mental health clinics. Additional research should clarify the impact of decision-making tools on other important outcomes such as engagement, patient-prescriber communication, quality of care, self-management, and long-term clinical and functional outcomes.

**Keywords** Psychotropic medication · Medication adherence · Shared-decision making · Computer intervention · Recovery

## Introduction

Increasing people's engagement in their own healthcare is a major goal of current attempts to reform healthcare (Say and Thomson 2003). These efforts have spurred interest in shared decision making, a collaborative process in which patients and clinicians share information and reach agreement regarding treatment through discussion (Adams and Drake 2006; Charles et al. 1999; Frosch and Kaplan 1999; Joosten et al. 2008; Jordan et al. 2002; Montgomery and Fahey 2001). In mental healthcare as well, clients/consumers, clinicians, and other stakeholders are calling for more person-centered care (Institute of Medicine 2001; Mueser et al. 2002; New Freedom Commission on Mental Health 2003; Toprac et al. 2000) and shared decision making (Adams and Drake 2006; Adams et al. 2007; Deegan and Drake 2006).

In general healthcare, decision aids and shared decision making have been increasingly used to enhance patient-

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centered care. Decision aids supplement the patient-clinician interaction by providing patients with information about illnesses, diagnostic tests, and treatments; by helping them to clarify their values, supports, and preferences; and by activating them to participate in making related health-care decisions. (O'Connor et al. 2007) Shared decision making denotes an interactive process between a clinician and client in which both share their expertise—the clinician's expertise on treatments, outcomes, and side effects, and the client's expertise on personal values and preferences (Charles et al. 1997). Research to date suggests that shared decision making and patient decision aids have a range of positive benefits. They have been shown to improve patient knowledge (Johnson et al. 2006; Morgan et al. 2000), well-being (van Roosmalen et al. 2004), decisional conflict (Mann et al. 2009) and sometimes adherence to medications (Wilson et al. 2010), although findings have been inconsistent (Loh et al. 2007; Von Korff et al. 2003). These interventions are less studied among individuals with mental health disorders, but at least seven controlled trials have shown that shared decision making can produce a variety of benefits among individuals with mental health disorders (Drake et al. 2009), including better adherence to antidepressants among depressed individuals participating in a program that incorporated shared decision-making (Ludman et al. 2003). In addition, a qualitative study of a community mental health center implementing a medication-focused decision support center found generally positive attitudes towards the center (Deegan et al. 2008). Although some have questioned the appropriateness of shared decision making for people with serious mental illnesses and associated cognitive impairments (Adams and Drake 2006; Amador and Johanson 2000; Roberts et al. 2002; Vollmann et al. 2003), many mental health consumers, clinicians, and other stakeholders support decision aids and shared decision making as important pathways to recovery (Adams and Drake 2006; Deegan and Drake 2006).

Psychotropic medication use represents an important focus for client-centeredness and shared decision making, and SAMHSA is currently developing a decision aid on antipsychotic medications (Substance Abuse and Mental Health Services Administration 2008). Many people with mental disorders experience “decisional uncertainty” regarding their use of psychotropic medications (Deegan and Drake 2006), which have relatively high rates of non-adherence, substantial side effects, partial effectiveness, and substantial risks related to non-adherence (Valenstein et al. 2002; Verdoux et al. 2000). To date, however, little research has been done on decision aids or shared decision making in relation to psychotropic medication management. Current medication algorithms omit or give superficial attention to shared decision making (Mistler and Drake 2008), despite calls for the use of patient-centered

collaborative models to improve adherence (Sajatovic et al. 2009). To contribute to the empirical evidence base regarding the impact of client-centeredness and shared decision making in the mental health field, this study examined the impact on medication adherence of a decision support center and computerized tool in an outpatient community mental health setting. We hypothesized that individuals using the support center would have greater rates of adherence to psychotropic medications than a comparison group who did not use the support center.

## Methods

### CommonGround

Described in detail elsewhere (Deegan et al. 2008), CommonGround is a computerized support system, combining aspects of decision aids and decision making, that clients use before medication visits (Deegan 2010). It was designed “to amplify the consumer's voice” and thereby to activate the consumer's participation in medication management visits. The software includes an introduction to the concept of recovery from mental illness and brief videos of consumers discussing how they achieved recovery. It also includes a brief customizable survey of the consumer's concerns regarding psychotropic medications, recent symptoms, current functioning, and goals for the medication management visit. CommonGround also contains decisional balance and trade-off exercises designed to help consumers clarify their values with respect to the use of psychotropic medications. CommonGround was implemented at a large community mental health center on September 1, 2008, and consumers used CommonGround in a decision support center in a private area of the waiting room prior to their medication management visit, with peer specialists available for assistance. The consumer's input regarding symptoms, functioning, side effects, and goals was summarized on a one-page report, available for review with the clinician during the medication visit.

### Population

To evaluate the impact of CommonGround and the decision support center, we used de-identified administrative data to identify non-dual eligible, consistently enrolled, Medicaid-eligible adults who received an antipsychotic, antidepressant, or mood-stabilizing psychotropic medication from September 1, 2007, through August 31, 2009. We identified individuals who had received a psychotropic medication in both the year prior to CommonGround implementation on September 1, 2008 and in the year after implementation. We then identified individuals from nine

community mental health outpatient clinics in the same region of Pennsylvania serving comparable populations, one of which implemented the decision support center and CommonGround. The study was declared exempt by the University of Pittsburgh IRB.

### Data and Variables

Using administrative pharmacy claims data, we calculated medication adherence for 180-day periods separately for antipsychotic, antidepressant, and mood-stabilizing medications. For each medication category, we calculated how many days in the 180-day period that an individual had filled a prescription. Multiple prescriptions filled on the same day for the same medication were assumed to be taken together to achieve a specific dose. Multiple prescriptions filled on the same day for different medications within the same medication category were assumed to be taken together for cross titration as part of a medication change. Prescriptions filled for the same medication on different days were assumed to be for serial use, and overlaps in supply were carried forward on the assumption that all medications were taken. The total number of day's supply of a medication category was then divided by the total number of possible days (180) to calculate an adherence rate.

We restricted our population at the clinic implementing CommonGround to consumers who had used the decision support center and CommonGround two or more times (CommonGround users). The comparison group was defined as consumers who had not used CommonGround. For all individuals, we calculated the pre-implementation 180-day medication adherence rate from the first observed prescription after the first observed clinic visit during the 12-month period prior to implementation. We calculated the post-implementation 180-day medication adherence rate for people using CommonGround from the first observed prescription following initial use of CommonGround. For the comparison group, we calculated the post-implementation 180-day medication adherence rate from the first observed prescription following their first clinic visit in the period after implementation.

We obtained sociodemographic data, including age, gender, race, and Medicaid eligibility category, from the state's membership and eligibility files. Race/ethnicity was categorized as Caucasian or minority. Consistent with other analyses of Medicaid-enrolled individuals (Zito et al. 2005), we categorized Medicaid eligibility by whether individuals were eligible due to disability or income. Variables indicating prior inpatient psychiatric admissions and diagnosis were developed using behavioral health claims data. We categorized people as having a prior inpatient psychiatric admission if they had a psychiatric hospitalization in the 12 months prior to their first use of

CommonGround or first observed visit following implementation, and as having schizophrenia, bipolar disorder, or major depression if they had a claim with the respective diagnosis in the 12 months prior to implementation.

### Data Analysis

To determine patterns of medication adherence, we calculated rates for each medication category in the pre and post implementation periods and examined differences between groups using Chi-square tests for categorical variables and t-tests for continuous variables. We used multivariate linear regression models to examine rates of medication adherence. We used those same multivariate linear regression models, including an interaction term for the CommonGround cohort in the post-implementation period, to determine if use of the program was associated with improved medication adherence, controlling for sociodemographic and clinical predictor variables, and secular changes between the pre-implementation and post-implementation time periods. For each medication, the final model included all independent variables. Results were considered significant at the  $p < 0.05$  level. All analyses were performed using the *Statistical Analysis System (SAS)* ("SAS Software, Version 9.1 of the SAS System for Windows," 2004).

### Results

We identified 122 individuals receiving psychotropic medications who were CommonGround users and 1,000 individuals receiving psychotropic medications in comparison clinics who did not use CommonGround, for a total sample of 1,122 (Table 1). Among the total sample of 1,122 clients (Table 1), 848 received antidepressant medications, 653 received antipsychotic medications, and 426 received mood stabilizing medications. The majority of consumers receiving psychotropic medications were female, Caucasian, and Medicaid-eligible due to disability. Individuals using CommonGround were significantly more likely than individuals in the clinics not using CommonGround to be receiving antipsychotic medications ( $p < 0.001$ ) and less likely to have a diagnosis of major depression ( $p < 0.05$ ). There were no other significant differences between users and non-users of CommonGround prior to CommonGround implementation.

Prior to implementation of CommonGround, consumers using CommonGround had comparable rates of medication adherence compared to individuals in clinics not implementing CommonGround with respect to antidepressants (70 vs. 70 %, respectively), antipsychotics (77 vs. 73 % respectively), and mood stabilizers (71 vs. 69 % respectively).

**Table 1** Sociodemographic and clinical characteristics of individuals receiving psychotropic medications

	N	CommonGround user		CommonGround non-user		p value
		n	%	n	%	
Total	1,122	122	11	1,000	87	
Gender						0.42
Male	397	37	30	360	36	
Female	725	85	70	640	64	
Age (years)						0.76
18–29	209	22	18	187	19	
30–44	349	41	34	308	31	
45–64	564	59	48	505	51	
Race						0.85
Minority	267	31	25	236	24	
Caucasian	855	91	75	764	76	
Medicaid Eligibility						0.23
Disability	881	103	84	778	78	
Income	241	19	16	222	22	
Recent hospitalization						0.20
Yes	205	16	13	189	19	
No	917	106	87	811	81	
Bipolar diagnosis						0.33
Yes	292	34	28	258	26	
No	830	88	72	742	74	
Schizophrenia diagnosis						0.13
Yes	350	44	36	306	31	
No	772	78	64	694	69	
Major depression diagnosis						0.02
Yes	346	26	21	320	32	
No	776	96	79	680	68	
Antidepressant use						0.81
Yes	848	90	74	758	76	
No	274	32	26	242	24	
Antipsychotic use						<0.001
Yes	653	90	74	563	56	
No	469	32	26	437	44	
Mood stabilizer use						0.23
Yes	426	55	45	371	37	
No	696	67	55	629	63	

Table 2 shows sociodemographic and clinical characteristics associated with better medication adherence across both groups. Older individuals were significantly more likely to be adherent to medications than younger individuals, and racial/ethnic minority individuals also had significantly lower rates of adherence to all medications than did Caucasians. People with hospitalizations in the prior year had significantly lower rates than those without such hospitalizations. People who were Medicaid eligible due to disability had significantly higher adherence rates than those who were Medicaid eligible due to income. Medication adherence did not consistently differ

significantly across medication classes by diagnosis or time period.

Table 3 shows relatively high rates of medication adherence across all medication types, and that CommonGround use did not influence medication adherence rates. Among people using the program, medication adherence to mood stabilizers and antidepressants was essentially unchanged, and the slight increase in adherence among users receiving antipsychotics was less than the increase among non-users. Controlling for sociodemographic and clinical characteristics and secular changes over time, these results did not change.

**Table 2** Factors associated with higher rates of adherence to psychotropic medications

	Antipsychotics				Antidepressants				Mood stabilizers			
	Estimate	SE	t	Pr >  t	Estimate	SE	t	Pr >  t	Estimate	SE	t	Pr >  t
Female	-0.02	0.01	-1.27	0.21	0.01	0.01	0.41	0.68	-0.05	0.02	-2.73	<0.01
Age	<0.01	<0.001	3.25	<0.01	<0.01	0.001	6.79	<0.001	<0.01	<0.001	2.80	<0.01
White	0.09	0.02	5.58	<0.001	0.11	0.02	7.22	<0.001	0.11	0.02	5.05	<0.001
Disability	0.10	0.02	4.09	<0.001	0.06	0.02	3.64	<0.01	0.05	0.02	2.23	<0.05
Inpatient	-0.06	0.02	-3.18	<0.01	-0.05	0.02	-2.71	<0.01	-0.11	0.02	-4.62	<0.001
Bipolar	-0.05	0.02	-2.82	<0.01	-0.04	0.01	-2.58	<0.05	<0.01	0.02	0.11	0.91
Depression	-0.04	0.02	-2.31	<0.05	0.02	0.01	1.36	0.17	-0.03	0.02	-1.14	0.25
Schizophrenia	0.04	0.02	2.22	<0.05	0.05	0.02	3.35	<0.001	0.03	0.02	1.26	0.21
CommonGround cohort	0.06	0.02	2.79	<0.01	0.05	0.02	2.53	<0.05	0.02	0.03	0.87	0.39
Time period	0.03	0.01	2.21	0.05	0.01	0.01	1.10	0.27	0.03	0.02	1.95	0.05

## Discussion

This study found that a decision support center and a computer program designed “to amplify the consumer’s voice” and enhance shared decision making in medication visits (Drake et al. 2010) had no impact on adherence rates for antipsychotic, antidepressant, and mood stabilizing medications. Other studies of the impact of shared decision making on medication adherence have had mixed findings (Ludman et al. 2003; Mahone 2004; Mann et al. 2009; Von Korff et al. 2003; Wilson et al. 2010), and our study accords with others that have found no impact.

Psychotropic medication adherence is important for individuals with serious mental health problems because poor adherence is associated with symptom exacerbation and rehospitalization (Sullivan et al. 1995; Svarstad et al. 2001; Valenstein et al. 2002; Weiden et al. 2004). Studies have documented low rates of medication adherence in individuals discharged from psychiatric hospitals (Teh et al. 2010; Verdoux et al. 2000; Zivin et al. 2009), but prior studies of medication adherence rates in community health centers are comparable to the higher rates we observed (Diaz et al. 2005). Consistent with studies documenting lower rates among individuals post-discharge, we found that individuals with recent psychiatric hospitalizations (Teh et al. 2010; Verdoux et al. 2000; Zivin et al. 2009) and racial and ethnic minorities (Cooper et al. 2003; Diaz et al. 2005; Interian et al. 2007; Kuno and Rothbard 2002; Paulose-Ram et al. 2007; Schnittker 2003) had lower rates of medication adherence. Continued efforts are needed to examine if interventions such as shared decision making can have a positive effect on medication adherence, particularly in settings and among individuals at highest risk for non-adherence.

There was substantial use of CommonGround by consumers who had access to it. Like other studies of computer and web-based interventions intended to improve the care

and/or outcomes of individuals with serious mental illness (see Ybarra (Ybarra and Eaton 2005) for summary), this use demonstrates the attractiveness and usability of such programs in community settings. Increasingly, studies are finding that such programs can improve the outcomes of individuals with mental health disorders (Christensen et al. 2004; Rotondi et al. 2010). Few studies, however, have examined the acceptability and feasibility of these interventions among individuals with potential cognitive impairments associated with severe mental illnesses (Rotondi et al. 2007). Feasible and acceptable computer and web-based interventions are a potential route to efficiently improving the care in community mental health settings of individuals with serious mental health disorders.

Our findings have several limitations. The population examined was limited to Medicaid-enrolled adults receiving psychotropic medications from nine community mental health centers in a region with relatively generous mental health benefits. We do not know if our findings would generalize to outpatient mental health clinics in other regions or serving other populations, or to treatment settings for which the baseline medication adherence rates were not as high, such as those being discharged from a psychiatric hospital or participating in a partial hospital program. We use claims data to assess adherence and do not know if individuals were actually taking the medication after having a prescription filled, nor do we know to what extent individuals were benefiting from their psychotropic medication. We also do not know to what extent the program may have led to changes in dosage or medications within a class. We note, however, that we would have observed if such changes in dosage or medication resulted in improved adherence. We only followed individuals for 180 days after their initial use of CommonGround or medication, and do not know in what way our findings would differ if we had been able to observe individuals for a longer period. People who were dually eligible for



**Table 3** Difference in 1-year standardized medication adherence in individuals using and not using CommonGround

Medication type	CommonGround users		Non-CommonGround users		Difference between CommonGround users and non-CommonGround users <i>p</i> value
	Pre-CommonGround	Post CommonGround	Pre-CommonGround	Post CommonGround	
		Change in adherence from pre to post CommonGround implementation		Change in adherence from pre to post CommonGround implementation	
	Mean medication adherence (SD)	Mean (SD)	Mean medication adherence (SD)	Mean medication adherence (SD)	
Antipsychotic	0.78 (0.27)	0.79 (0.24)	0.67 (0.27)	0.71 (0.25)	ns
Mood Stabilizer	0.71 (0.25)	0.72 (0.25)	0.63 (0.29)	0.68 (0.27)	ns
Antidepressant	0.75 (0.25)	0.73 (0.25)	0.67 (0.29)	0.66 (0.28)	ns

Medicaid/Medicare were excluded due to our inability to observe their medication claims. While we know that consumers used the program, we are unable to identify prescribing physicians, and we do not have information regarding to what extent use of the program affected individual's behavior when meeting with practitioners, nor if those practitioners had the skills and willingness to engage in shared decision making with clients, questions that would be important to examine in future evaluations.

Finally, our study focused on medication adherence, and we do not know how the program influences other important outcomes such as consumer activation, empowerment and satisfaction. The CommonGround program was designed to amplify the consumer's voice and improve shared decision making with clinicians regarding medications. While some studies have found that shared decision making is associated with improved psychotropic adherence, that is not the primary goal of most shared decision making interventions nor of the CommonGround program. Improved adherence might be more efficiently achieved by interventions designed specifically for that purpose (Patel et al. 2010; Velligan et al. 2010). CommonGround seeks to facilitate the client's ability to discuss with clinicians their concerns about medications, such as their desire to be on a lower dose, a different medication, a simpler regimen, or fewer medications. By doing so, CommonGround is intended to help prescribers to understand what is most important to the client and thereby to strengthen the therapeutic alliance. Another goal of CommonGround is to help people understand their illnesses and treatments so that they can take greater responsibility for illness management and be less dependent on the mental health system over time. We were unable to examine CommonGround's impact on such outcomes. Further research is needed to examine whether computer programs such as CommonGround can be as effective in empowering and activating mental health clients as non-computerized interventions, such as the Right Question Project- Mental Health (Alegria et al. 2008), as technology supported interventions are likely to be more efficient and scalable.

Despite these limitations, this study provides one of the first empirical examinations of the impact of a decision support system designed to enhance shared decision making by people receiving psychotropic medications. High rates of use of the program suggest that such computerized interventions are acceptable to and usable by Medicaid-enrolled adults in community mental health centers. Ultimately, however, the goal of this and other shared decision making interventions is to improve the quality of care and the subsequent clinical and functional outcomes of individuals being served, and improvements in the quality of care and outcomes for individuals with serious mental illness requires that efforts are focused on the dissemination

of such effective programs (Horvitz-Lennon et al. 2009). Our study also highlights the importance of better understanding the range of factors necessary for effective implementation of shared decision making interventions in community mental health centers, because disseminating patient decision aids does not equate with shared decision making (O'Connor et al. 2004). Finally, because decision support tools are highly valued and may enhance client-centeredness, the field needs to understand the relationship between such tools, clinical processes, and client's clinical and functional outcomes.

**Acknowledgments** This research was funded by Community Care Behavioral Health Organization and the West Foundation. The authors would like to thank Laura Greenberg and Amanda Ayers for assistance in manuscript preparation.

**Conflict of interest** Dr. Deegan is the owner of the Common-Ground software program. The remaining authors have no interests to disclose.

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