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From hospital admission to independent living: Is prediction possible?

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ABSTRACT

An integral component of recovery from mental illness is being able to engage in everyday activities. This ability is often restricted among people with schizophrenia. Although functional deficits are addressed during hospitalization, the ability to predict daily functioning based on information gathered during hospitalization has not been well established. This study examines whether measurements completed during hospitalization can be useful for predicting independent living within the community. Inpatients with schizophrenia ($N=104$) were enrolled in the study and assessed for cognitive functioning, functional capacity and symptoms. They were approached again 6 months after discharge to evaluate their functioning with respect to everyday life Instrumental Activities of Daily Living (IADL) and Activities of Daily Living (ADL). Functional capacity during hospitalization predicted 26.8% of ADL functioning and 38.8% of IADL functioning. ADL was best predicted by the severity of negative symptoms, cognitive functioning, and the number of hospitalizations (51.2%), while IADL was best predicted by functional capacity, cognition, and number of hospitalizations (60.1%). This study provides evidence that evaluations during hospitalization can be effective, and demonstrates the advantage of a holistic approach in predicting daily functioning. When a holistic approach is not practical, a functional capacity measurement may serve as an effective predictor.

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1. Introduction

The goal of mental health services is to help clients to recover from mental illness (Substance Abuse and Mental Health Services Administration (SAMHSA), 2012; Barber, 2012). Although there are various conceptualizations of 'recovery', an important component identified by clients, families, and service providers is the ability to participate in meaningful everyday activities (Boutiller et al., 2011; Substance Abuse and Mental Health Services Administration (SAMHSA), 2012; Barber, 2012). However, little is known about how to predict daily functioning based on evaluations conducted during the hospitalization.

While there is great variability in the functioning of people with schizophrenia, most will exhibit a decline in the diversity and frequency of the activities that they participate in (Schretlen et al., 2000; Bejerholm and Eklund, 2004, 2006; Berry et al., 2007; Miles et al., 2011). The functional decline that occurs in people with schizophrenia has been widely investigated in community settings over the last decade (e.g. Twamley et al., 2002; Siegel et al., 2006; Bowie et al., 2006, 2008; Sitzer et al., 2008; Harvey et al., 2011; Vesterager et al.,

2012; Best et al., 2014). However, the ability to predict daily functioning based on information obtained during hospitalization has only been partially established (Wittorf et al., 2008; Spellmann et al., 2012). Currently, many intervention programs for community reintegration are initiated during hospitalization. These programs address a wide range of everyday activities, such as vocational needs, leisure, social participation, and home management. One of the important questions posed to people with schizophrenia is whether changes in housing situation should be considered in order to prevent further hospitalization and to promote the recovery process. Specifically, it is crucial to identify the type of required changes since community services provide a variety of housing programs with various levels of support. Recommendation for specific housing support programs greatly depends on the level of independence in Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). The ADL contain activities associated with taking care of one's body (e.g. grooming, dressing, eating, etc.), while the IADL refer to more complex activities involving interactions with the environment (e.g. financial management, home management, meal preparation, etc.) (American Occupational Therapy Association – AOTA, 2008). Although recommendations for community services and development of reintegration programs are commonly based on evaluations completed during hospitalization, little has been done to establish the effectiveness of these evaluations (Bromley et al., 2011).

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There are many factors that may potentially affect the predictive ability of the hospital evaluation process regarding real-world functioning, thereby reducing its clinical utility. Daily functioning depends on complex interactions between the person, the environment, and the characteristics of the task being attempted (Law et al., 1996). Thus, factors such as the evaluation environment, evaluation task, and personal health status may affect the results. Moreover, inpatient stays include very structured environments and activities, which restrict patients' daily functioning (Law et al., 1996; Palmer et al., 2002). The evaluation tasks performed in this environment are often formal and standardized tests which are not typically representative of daily community life. Hence, these tests may not capture the full scope of people's abilities or areas of expertise. In addition, the need for hospitalization suggests a change in an individual's health status, such as the symptoms' exacerbation or a decline in cognitive abilities, which may affect their performance during the evaluation (Siegel et al., 2006; Bonner-Jackson et al., 2010). Even with these potential limitations, an evaluation process during hospitalization that supports reintegration into the community was found to be one of the most important tasks of current mental health services in addition to medical management (Lloyd and Williams, 2010).

Previous research, which has typically been conducted in community settings, has investigated how cognitive abilities, schizophrenia symptoms, and functional capacity impact daily functioning. There is consistent evidence regarding the influence of cognition on daily functioning (e.g. Keefe et al., 2006; Siegel et al., 2006; Bowie et al., 2006, 2008; Harvey et al., 2011; Vesterager et al., 2012; Best et al., 2014). Still, the specific cognitive domains and extent of their influence varies among studies (Green et al., 2000, 2004a, 2004b; Vesterager et al., 2012). Findings regarding the effect of schizophrenia symptoms on daily functioning are inconsistent. There are a number of studies that demonstrate the influence of both negative and positive symptoms on different parameters of daily functioning, such as independence in one's current living situation or functional capacity to maintain one's home (Palmer et al., 2002; Twamley et al., 2002; Evans et al., 2003; Bowie et al., 2006; Vesterager et al., 2012; Best et al., 2014). Yet, some studies did not find that negative or positive symptoms impacted daily functioning (Addington and Addington, 1999; Velligan et al., 2000; Bell and Bryson, 2001). Recently, functional capacity assessments have been used as an outcome measure and predictor of daily functioning (e.g. Keefe et al., 2006; Bowie et al., 2008; Mausbach et al., 2008; Leifker et al., 2009; Harvey et al., 2011). Studies that use functional capacity assessments as a predictor demonstrate that it predicts independent living and the ability to function in the real-world (e.g., interpersonal skills, work skills, and community activities) (Bowie et al., 2006; Mausbach et al., 2008; Best et al., 2014). Two studies that followed up with people who had schizophrenia 1 year after discharge from the hospital identified psychopathological, cognitive, and socio-demographic factors as predictors of functional outcomes and remission after discharge. They demonstrated that daily functioning might be predicted on the basis of illness related information (i.e., age of illness onset,

response to medication, duration of hospitalization, severity of negative and positive symptoms); premorbid factors (status of employment and social adjustment); results of a multidimensional scale comprised of items relating to functioning, personal and family illness related information); and by cognitive functioning and sex (Wittorf et al., 2008; Spellmann et al., 2012). However, each of these studies focused on different sets of predictors and neither included functional capacity measurements as predictors of community functioning.

This study adds to current literature by exploring whether assessments of cognitive functioning, schizophrenia symptoms, and functional capacity completed during hospitalization, as well as demographic variables and illness-related data, can successfully predict the ADL and IADL functioning of people with schizophrenia who are living in the community 6 months after being discharged from the hospital.

2. Methods

2.1. Participants

In the first stage of the study we approached 104 adults with schizophrenia who were hospitalized in acute care units of a regional mental health center. All the participants had been treated with antipsychotic drugs for at least 4 weeks prior to the study and had not been hospitalized for longer than 4 months. People with intellectual disabilities, head injuries, physical disabilities, and psychosis due to substance and alcohol abuse were excluded from the study. Individuals who met the study criteria were recruited consecutively until the target sample size of $N=100$ was reached.

The participants included 31 women (29.8%) and 73 men (70.2%). Most participants were single ($N=77$, 74%), lived with their parents ($N=60$, 57.7%), and were not employed prior to their hospitalization ($N=64$, 61.5%). Participants' hospital stays ranged from 4 to 15 weeks prior to the onset of study ($M=7.1$, $S.D.=2.7$). Demographic and illness related data are presented in Table 1.

The second stage of the study began 6 months after discharge. For this stage we contacted the original participants. Participants were excluded from the 2nd phase if their initial hospitalization was longer than 6 months, if they had been readmitted to the hospital during the preceding 6 month period, or if they could not be contacted (such as changes in contact details of the participant or the caregiver) ($N=34$, 32.7%). In total, 70 (67.3%) participants from the first stage of the study took part in the second stage. No differences were found between the participants of the second stage and the drop-out group with respect to demographic and illness-related data. However significant differences were found between them concerning negative schizophrenia symptoms, memory, language understanding, and functional capacity (see Tables 1 and 2).

2.2. Measures

2.2.1. Functional capacity

The Observed Tasks of Daily Living-Revised (OTDL-R) was administered to evaluate functional capacity. The OTDL-R is a performance-based measure of three IADL domains: taking medications, using the telephone, and managing finances (Diehl et al., 1995). OTDL scores range from 0 (does not demonstrate everyday competency) to 25 (demonstrates high level of everyday competency). The test has good inter-rater reliability (0.71) and internal consistency ($\alpha=0.80$), as well as concurrent and construct validity as found using a factor analyses (3 factor model, $\Delta\chi^2(3)=16.37$, $p<0.001$) (Diehl et al., 1995). The OTDL was found to discriminate

Table 1
Demographic and illness related data and differences in these parameters between 2nd stage and drop-out groups.

	1st stage			2nd stage			Drop-out			Analysis
	Range	M	S.D.	Range	M	S.D.	Range	M	S.D.	t_{102}
Age	19–50	33.4	9	19–50	34.3	9.3	19–25	31.5	8.4	1.49
Age of illness onset	14–46	23.7	6	14–36	24.1	5.3	14–46	22.8	7.5	1.04
	Range	M	S.D.	Range	M	S.D.	Range	M	S.D.	Z
Education	4–17	11.5	2.4	7–17	11.7	2.2	4–17	11	2.8	–1.44
Illness duration (years)	1–34	10	8.4	1–34	10.6	8.5	1–25	8.9	8	–0.99
Number of hospitalizations	1–20	4.9	4	1–20	4.99	4.2	1–12	4.7	3.8	–0.035
Period of hospitalization (months)	NA	NA	NA	1–5	2.6	1.3	1–5	2.9	1.3	–1.72

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