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ORIGINAL PAPER

An Examination of Treatment Outcomes at State Licensed Mental Health Clinics

James McQuade · Elena Gromova

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Abstract Mental health clinics that are licensed and regulated by their respective states constitute a vast mental health delivery system. Yet these programs, while operating for the last 40 years, have not been subject to systematic review. This retrospective study of archival data investigated the relationship between intensity of clinic treatment and hospital-based treatment episodes and polypharmacy. The sample was comprised of 562 patients with diagnoses of MDD, bipolar disorder, or a schizophrenia spectrum disorder, drawn from four state-licensed community clinics. These clinics provided a relatively heterogeneous model of care consisting of psychotherapy, medication management, and critical case tracking. Subjects with the highest number of treatment visits (31 or more) had a 62 % reduction in the incidence rate ratio of hospital-based treatment episodes compared to subjects with the least visits (15 or less). Subjects with 15–30 visits also fared well with an 82 % reduction in the incidence rate ratio of hospital-based treatment. Secondarily, a diagnosis of schizophrenia or bipolar disorder resulted in a significantly higher incidence of hospital treatment than a diagnosis of MDD. Polypharmacy, measured at the .01 level, was not found to be associated with treatment intensity. The findings lend support to the outpatient clinic treatment model as a viable system that can significantly reduce costly hospital-based psychiatric care. At least for the diagnoses examined, early drop out is detrimental and increases the probability that hospital-based treatment will become necessary.

Keywords Outpatient treatment · Community clinics · Hospitalizations · Polypharmacy

Introduction

Deinstitutionalization has been a driving force in mental health care for the past 40 years moving thousands of patients from in-hospital treatment to community based care. While many models and meta- models of community care have evolved clinic treatment has been a constant throughout the decades. Clinic treatment usually consists of a combination of psychotherapy and psychopharmacology, with some ancillary services. Every state in the union has some form of public mental health system where the community clinic model is utilized. This system of care has both advocates and critics. To advocates, community clinics have been the "work horse" providing treatment for evermore complex cases. To critics this system of community care is related to a "revolving door" phenomenon (Erickson 2005; Machado et al. 2012) in which seriously mentally ill people alternate between inpatient care and outpatient treatment. However, as summarized in the brief literature review below we found no systematic studies on the efficacy of outpatient clinic treatment conducted in state-sponsored agencies. In this study, we addressed this gap in the literature by systematically examining the relationship between length of clinic treatment and outcome indicators, such as, frequency of hospital-based treatment episodes and incidence of polypharmacy. Polypharmacy is

Participating sites—Western Queens Consultation Center, Metropolitan Center for Mental Health, Queens Neuropsychiatric Institute and Long Island Consultation Center

J. McQuade (✉) · E. Gromova
40-23 62nd st 2nd fl, Woodside, NY 11377, USA
e-mail: jamesmcq@live.com

E. Gromova
e-mail: egromova@mhpwq.org

defined as simultaneous use of two or more medications to treat the same mental health condition.

Literature Review

In reviewing the literature we found little to cite of immediate relevance. There is a large body of therapy outcomes literature. These studies tend to focus on comparison between schools of therapy or therapy compared with medication. A meta-analytic review conducted by Shedler (2010) looks at 475 such studies comparing CBT psychodynamic and medication interventions. The studies reviewed tend to be short term, they do not control adequately for diagnosis and involve a small sample size. None of these studies examined outcomes at urban community clinics over an extended period.

There are a few studies conducted within the NYS system that are related somewhat to the present analysis. These are reviewed below.

With the increased emphasis on community treatment came the challenge of treatment continuity, especially for the seriously mentally ill. To address this, some states have turned to mandated care. One study of court mandated outpatient treatment under New York State's "Kendra's Law" demonstrated a significant reduction in hospitalizations for recipients mandated to outpatient care in Erie County, New York (Erickson 2005).

Erickson (2005) reported that the average number of hospitalizations for persons in an outpatient commitment program was one, which was a striking contrast with three or more hospitalizations preceding the start of outpatient services. The author further noted that 55 % of study participants had no hospitalizations during the time they were receiving outpatient treatment and clients who had high consistency with regard to medication, psychotherapy attendance, and substance abuse treatment engagement demonstrated the most positive outcomes. This study, however, had a limited sample of 100 subjects and the forms of treatment received by participants were not sufficiently differentiated. Although this study provided support to the premise that outpatient treatment is an effective way of managing psychiatric symptoms and preventing hospitalizations, this claim is limited by the size of the sample and the focus on programs where treatment is court mandated.

In another study, Swartz et al. (2009) examined the effects of court-ordered outpatient care designed to keep the patients connected to treatment. The authors found that the incidence of hospitalizations decreased and medication compliance increased for this mandated population. However, when exploring the factors contributing to the effectiveness of this form of mandated treatment, the authors focused almost entirely on care management paradigms and surprisingly failed to examine the actual form of clinical care clients received. About 20 % of these mandated clients received psychiatry services via a mobile team. The study leaves unanswered where the remaining 80 % received clinical services. There is no reference to whether clients received any form of psychotherapy or counseling.

Finally, there is the influence of length of stay on treatment outcomes to consider. Prior research has not assessed the relationship between length of outpatient treatment and one of the most costly episodes of care—psychiatric hospitalizations. This study investigated the relationship between intensity of clinic treatment (see definition of terms) and hospital-based treatment episodes and polypharmacy. In contrast with aforementioned studies that examined outpatient treatment enhanced with other services, such as assertive community treatment, this study sought to identify independent outcomes of clinic treatment provided at state- licensed mental health facilities to non-mandated clients.

Definition of Terms

Psychiatric Services and Clinical Knowledge Enhancement System (PSYCKES) is a HIPAA-compliant, web-based portfolio of tools designed to support quality improvement and clinical decision-making. In addition to other features, it enables the user to measure the number of hospital-based treatment episodes and the medications utilized by the subject.

Polypharmacy—refers to the prescription of more than one mental health medication for a consumer. The prescribing practices flagged include combining two or more psychotropic medications to treat the same condition, the use of two or more drugs in the same chemical class, concurrent use of four or more psychotropic medications of any type in adults, or three or more in children.

Clinic treatment (*outpatient treatment*) the model of treatment utilized by the participating clinics was relatively uniform because of a shared treatment philosophy and compliance with quite detailed state regulations. This treatment model incorporates the following elements: (1) individual psychotherapy sessions, predominantly psychodynamic modality with elements of CBT, scheduled on a weekly basis with an anticipation of failure-to-show rate of 25 %. (2) medication management scheduled once per month, with an anticipated failure-to-show rate of 15 % (3) clinical supervision scheduled once a week (4) critical case management by a designated committee that meets regularly and reaches into the treatment process where the client is deemed at risk of regression or high-risk behaviors

(5) 24/7 telephone coverage for crises (6) liaison with probation officers and dispatch of mobile crisis units when deemed necessary by the critical case tracking committee.

Hospital-based treatment episode (*HBTE*) refers to mental health related emergency room visits (with or without hospital admission) or hospital admission for a psychiatric condition. This variable was measured as the total number of days spent at the hospital; each ER visit was counted as 1 day of hospital-based treatment.

Treatment intensity this variable was measured as the total number of outpatient visits. In order to distinguish between the outcomes associated with different levels of care, we collapsed this variable into three categories, 0–15 visits, 16–30 visits, and 31 or more visits.

Incidence rate ratio (*IRR*) represents the change in the dependent variable in terms of a percentage increase or decrease, with the precise percentage determined by the amount the IRR is either above or below 1 (Piza 2012). For instance, an IRR of 1.25 would indicate an increase of the dependent variable by 25 % with every one unit increase of the independent variable. Conversely, a 25 % decrease of the dependent variable as a function of the independent variable would be noted as 0.75 (0.25 less 1).

Research Design

Population

The population of interest for this study included patients diagnosed with *major depression, bipolar disorder, and a schizophrenia spectrum disorder* who received clinical services at state-licensed community mental health clinics in the outer boroughs of New York City.

The accessible population for the purpose of the study included consumers of mental health care at four such clinics, between 1000 and 2000 patients.

Sampling Method

The sampling frame through which access to the population was gained was clinics' internal records for the 2012 calendar year matched with selected data for the same calendar year. Using these records, designated clinic staff members were able to identify individuals with relevant clinical diagnoses and the number of clinic visits in the year of 2012. This information was further deidentified to protect confidentiality and combined with the information regarding quality flags, namely, hospitalizations and polypharmacy. The resulting sample size was $n = 562$.

Research Questions

1. The first research question investigated the predictive relationship between treatment intensity and occurrence of hospital-based treatment episodes (HBTEs). Here we have the core question of the study. If patients remain in community clinic treatment, are they less likely to need hospital-based care?

2. The second question examined was the relationship between diagnosis and hospital-based care. Diagnosis had three categories: MDD, bipolar disorder, and schizophrenia spectrum disorder.

3. Finally, the clinical model being investigated involved scheduling psychiatric consultations at 4–6 weeks intervals, preferably with the same psychiatrist. By having access to this quality of psychiatry on an ongoing basis, is medication usage more discreet with less incidence of multiple medications being prescribed for the same psychiatric condition? To examine this question, the association between treatment intensity and incidence of polypharmacy was investigated.

Research Variables

The first independent variable in the proposed study was treatment intensity, measured as the number of outpatient visits. This variable was further recoded into three distinct categories to facilitate statistical analyses: 0–15 visits, 16–30 visits, and over 31 visits. By setting this variable at three designated levels it was possible to differentiate between short-term treatment, intermediate-length treatment, and longer term treatment. On average, patients were scheduled for four sessions of individual psychotherapy per month and about 10 sessions of medication therapy per year. Thus, the number of outpatient visits included both psychotherapy and medication therapy.

The second independent variable was clinical diagnosis with three levels: Major depression, bipolar disorder, and schizophrenia spectrum disorder.

The first dependent variable was the length of hospitalizations for a psychiatric issue, measured in days. This variable was designated as "hospital-based treatment episode" (HBTE). Absence of hospitalizations in the year of 2012 was coded as zero, whereas each visit to the emergency room accounted for 1 day of hospital-based treatment. For patients who were admitted to the hospital, each day was recorded as a treatment episode. The first dependent variable (HBTE) was therefore a count variable. The second dependent variable examined was polypharmacy, defined as a combination of two or more psychotropic medications to treat the same mental health condition.

Ethical Considerations

The study protocol was reviewed and approved as exempt research by an independent IRB at Biomedical Research Association of NY (BRANY), BRANY IRB approval # 14-12-283-386. The study was deemed to involve the collection of existing data in such a manner that subjects could not be identified, directly or through identifiers linked to the subjects. Therefore, informed consent requirement was waived due to exempt status of this study.

Methods and Results

Participants

This study was a retrospective analysis of deidentified archival data for the calendar year of 2012. The data were provided by four mental health clinics licensed by NYS—*Western Queens Consultation Center, Metropolitan Center for Mental Health, Queens Neuropsychiatric Institute, and Long Island Consultation Center*. Each participating site combined its internal records on patient visits with data obtained from *Psychiatric Services and Clinical Knowledge Enhancement System* (PSYCKES); the latter was the main source of information regarding hospitalizations and polypharmacy.

The compiled set of data included such variables as the number of clinic visits in 2012 for each patient included patients' age, gender, presence or absence of polypharmacy, and the duration of hospital-based treatment episodes in days for the year 2012. The constructed sample consisted of 562 cases.

Statistical Analyses

Statistical analyses were performed using SPSS version 21. Selected alpha level for all analyses was .01, as opposed to a more conventional alpha level of .05, in order to increase the rigor of statistical tests and minimize the chance of Type I error.

Descriptive Statistics

The sample consisted of 412 women (73.3 %) and 150 men (26.7 %); the mean age of participants was 47 years. These demographic data are also reported in Table 1 below.

An independent samples t test revealed no significant differences in the mean age of patients with and without HBTE incidence, $t\ (560) = -.693$, $p = .489$. χ^2test of independence showed no association between gender and incidence of HBTEs, $\chi^2\ (1, N = 562) = .017$, $p = .898$. Therefore, subsamples of patients with and without HBTEs were not significantly different on the basis of age or prevalence of males and females.

The first dependent variable (HBTE length), which was a count of the total number of days that the patient spent at the hospital, had a significant positive skew (skewness = 9.2). The obtained distribution was not normal, Shapiro–Wilk's statistic = .148, df = 562, $p < .001$.

Results

Due to a dependent variable's significant departure from the shape of normal distribution, traditional parametric tests could not be conducted, and alternatives, such as logistic regression, Poisson regression, and negative binomial regression were considered instead. Furthermore, our dependent variable was a count variable with discrete values that reflected the occurrence of psychiatric hospitalizations in a fixed period of time, and the choice of a statistical model had to account for the high count of zeros (because many patients had no recorded hospitalizations) and a significant positive skew of the dependent variable's distribution. Logistic regression was not chosen due to an increased likelihood of the model being underpowered when the count dependent variable with discrete values is collapsed into a dichotomous response variable, as per the requirements of this statistical model (Coxe et al. 2009; Piza 2012).

Poisson and negative binomial regression models are commonly used to analyze count data and rare events (Coxe et al. 2009). Given that the incidence of hospital-based treatment episodes in our sample was relatively low with, and the majority of patients in the sample did not have psychiatric hospitalizations, the inflated count of zeros could be adequately accounted for in the formulas of Poisson and negative binomial regression (Piza 2012). The difference between the two models is in the assumption regarding the conditional mean and variance: Poisson regression assumes equality of conditional mean and variance, while negative binomial regression model doesn't and is particularly well-suited for data that are overdispersed (Berk and MacDonald 2008; Piza 2012). The results of either model can be interpreted in terms of incidence rate ratios (IRR) which indicate a percentage change in the dependent variable with every one unit increase in the independent variable.

For this analysis, negative binomial regression was chosen over Poisson regression on the basis of the dependent variable's overdispersion, M = .72 and SD = 4.556.

The omnibus test of negative binomial regression model with treatment intensity and clinical diagnosis as predictors of incidence of hospital-based treatment episodes (HBTE)

was significant, $p < .001$, suggesting the superiority of the built model to the model including only an intercept. Clinical diagnosis was a significant predictor of HBTE length, Wald χ^2 (2, N = 562) = 9.446, p = .009. The number of clinic visits was also a significant predictor of HBTE length, Wald χ^2 (2, N = 562) = 62.171, $p < .001$. There was no significant interaction found between the clinical diagnosis and the number of clinic visits on the dependent variable, therefore only the main effects of factors were reported.

Table 2 reports the results of negative binomial regression model of the length of hospital-based treatment episodes holding the covariate of age as constant.

Utilizing a negative binomial regression model, the incidence rate ratio (IRR) of hospital-based treatment episodes (HBTEs) was found to be reduced by 82 % among patients with 16–30 visits compared to those with the least number of visits. A similar pattern of differences was observed when the group with the most number of clinic visits (31 or more) was compared to the group with the least number of visits (0–15 visits): In particular, 31 or more clinic visits were predictive of a 62 % reduction in the incidence rate ratios (IRR) of hospital-based treatment. Thus, significant differences in incidence rate ratios of hospital-based treatment episodes (HBTEs) were found between the group that received the lowest level of treatment intensity and both groups that received higher levels of clinical care.

Table 1 Demographic characteristics of the sample

	Characteristic N = 562
Age range (years)	18–81
Average age (± SD)	47 (15)
Percentage of males	26.7
Percentage of females	73.3

A diagnosis of a bipolar disorder was predictive of a 64 % increase in the incidence rate ratio (IRR) of HBTEs compared to a diagnosis of a major depression, p = .004, and a diagnosis of a schizophrenia spectrum disorder was predictive of 80 % increase in the IRR of HBTEs, $p < .001$, both compared to a diagnosis of a major depressive disorder.

Chi square test of independence of polypharmacy and clinic visits was not significant at the predetermined alpha level of .01, χ^2 (2, 562) = 7.9, p = .03. Thus, in this study the intensity of clinic treatment (0–15 visits, 16–30, and 31 or more visits) was not associated with polypharmacy incidence, indicating that the observed count of patients flagged with polypharmacy did not significantly vary at the three levels of treatment intensity. Therefore, the null hypothesis regarding the relationship between polypharmacy and treatment intensity was retained.

Discussion

Mental disorders are known to be costly to treat, and schizophrenia and bipolar disorder are among the most disabling mental illnesses that require ongoing treatment (Bhugra and Flick 2005, Javitt 2014). Consistent with the results of prior studies that reported an increased fiscal burden associated with diagnoses of bipolar disorder and schizophrenia, this study demonstrated an increased length of hospital-based psychiatric treatment among patients with a diagnosis from a bipolar or schizophrenia spectrum relative to a diagnosis from a major depressive disorder spectrum. This finding indicates that the task of preventing psychiatric hospitalizations and thus reducing the costs of care is particularly challenging in reference to the population of patients with schizophrenia and bipolar disorder compared to patients with MDD.

Another noteworthy relationship that emerged in the context of this study was between intensity of outpatient

Table 2 Negative binomial regression model of HBTEs using diagnosis and number of clinic visits as predictors

Variables	Hypothesis test			Exp(B)	95 % wald confidence interval for Exp(B)	
	Wald χ^2	df	Sig.		Lower	Upper
0–15 clinic visits[a]	–	–	–	1.000	–	–
16–30 clinic visits	55.150	1.000	.000	.179	.114	.282
31 or more clinic visits	41.250	1.000	.000	.383	.286	.514
MDD[a]	–	–	–	1	–	–
Bipolar disorder	8.19	1.000	.004	1.639	1.168	2.299
Schizophrenia spectrum	12.4	1.000	.000	1.798	1.297	2.493

Dependent variable HBTE length, *Model* (Intercept), number of clinic visits, diagnosis

[a] Reference categories: 0–15 clinic visits; MDD

treatment and duration of hospital-based treatment, more specifically, intensity of outpatient treatment had a significant impact on reducing the length of hospital-based treatment for a psychiatric condition. This was evidenced by an 82 % reduction in incidence rate ratios of psychiatric hospitalizations among patients who attended 16–30 clinic treatment sessions and a 62 % reduction in the incidence rate ratios of psychiatric hospitalizations among patients with 31 or more clinic visits, both compared to outpatients with the least number of visits. Thus, both medium and high treatment intensity predicted a significant decrease in incidence rate ratios of hospitalizations when compared to low treatment intensity.

Clients who had less than 15 visits were at much greater risk of requiring hospital-based care. The difference was substantial and immediately apparent. This finding suggests that the greatest challenge for clinic providers is to engage the most vulnerable patients in the early weeks of treatment and to focus intensely on preventing dropouts. There is a cautionary note here for managed care organizations who are often reluctant to approve care beyond the 15–20 visit mark. At least, for more seriously mentally ill clients, early termination may result in costly hospital-based care.

A finding of a larger reduction in the incidence rate ratio of hospitalizations for the medium intensity treatment group compared to the high intensity treatment group could be explained by a statistical phenomenon similar to regression to the mean. Another possible explanation is that patients in the longest form of treatment were more likely to be more psychiatrically ill. In other words, since patients were not randomly assigned to "treatment intensity", they may have had different levels of treatment depending on their psychiatric needs. Over time, it is reasonable to speculate that among the most psychiatrically impaired, a larger number will require hospital-based care.

Prior studies have already shown a strong association between a mental illness diagnosis and incidence of preventable hospitalization for various medical conditions (McGinty and Sridhara 2014). It is clear from this research that individuals with a mental illness diagnosis disproportionately utilize the medical system. At the same time, documented attempts to examine the contribution of outpatient psychiatric clinic treatment to the goal of reducing psychiatric hospitalizations have been virtually nonexistent. To our knowledge, this study was the first one to address the relationship between a widely practiced outpatient treatment model and important treatment outcomes, such as duration of psychiatric hospital-based treatment and psychiatric polypharmacy. Given the widespread use of the state regulated clinic treatment model and the enormous emphasis on hospital diversion, it is imperative that more field studies be conducted to evaluate the efficacy of similar treatment interventions.

Limitations

This study was limited to the examination of treatment outcomes from a general clinic population at NYS-licensed clinics. This model of treatment is relatively uniform across all participating agencies and incorporates elements, such as individual psychotherapy, psychopharmacology, critical case tracking, and use of external supports. It is recognized that clinic treatment in this model is a group of interventions, and this study provided no means to differentiate between treatment elements or to attribute effect size to individual elements.

The study did not compare and contrast treatment outcomes between participating sites, and the subject of whether there are systematic differences in outcomes across the sites remains open for future studies to address. Additionally, this study was a retrospective analysis of archival data, and the investigators had limited control over data parameters since the data were initially obtained for purposes other than research.

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