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Efficacy of care with Assertive Community Treatment in Sever Mental Illness

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EFFICACY OF CARE WITH ASSERTIVE COMMUNITY TREATMENT IN SEVERE

MENTAL ILLNESS

by

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Abstract

Background: Severe mental illness is a devastating and undertreated problem in our society. Assertive Community Treatment (ACT) services could help fill the void left from the deinstitutionalization movement providing the severely mentally ill the needed support while allowing them to remain in their communities.

Aim: This evidence-based scholarly (EBP) project addressed the following question; How does length of time in ACT affect the number or length of hospitalizations, and incarcerations in patients with severe mental illness.

Methods: This project is a program evaluation of an Assertive Community Treatment Team Program in a metropolitan city. The impact evaluation consists of data collected by medical record review of the ACT patients, covering their first year of participation in ACT services, assessing number of hospitalizations, number of hospital days, number of 30-day readmissions, and number of incarcerations. The process evaluation was done using the Dartmouth ACT fidelity score.

Results: No significant differences were found for any of the study measures with the exception of the mean hospitalization number from the first three-month period (0.1290 ± 0.42755) to the second three-month period (0.3226 ± 0.59928), ($t(30) = -2.257$, $p=0.031$). Mean increased of 0.19355 with a 95% CI between -0.36868 and -0.0184. The magnitude of effect was large (eta squared $=0.145$).

 Implication for Practice: Although no significant findings related to ACT reduction in resource utilization were found, a significant increase in hospitalization was found within the three-month time frame which was contrary to initial expectations of the project. Additional studies are

needed to reconcile this finding. Recommendations were made for collection of additional data during admission to ACT to enhance better understanding of the impact of ACT on severely mental ill community dwellers.

Key Words: Assertive Community Treatment, Severe Mental Illness, Hospitalization, and Intensive Case Management.

Efficacy of Treatment with Assertive Community Treatment in Severe Mental

Illness

The devastating nature of mental illness is an under-acknowledged problem in our society. According to the Nation Institute of Mental Health (NIMH) in 2016, there were an estimated 10.4 million adults aged 18 years or older in the United States with severe mental illness (SMI). This number represented 4.2% of all U.S. adults. Of those individuals, only 6.7 million (64.8%) received mental health treatment in the past year (NIMH, 2016).

According to one study by Vigo, Thornicroft, and Atun (2016), the global burden of mental illness accounts for 32% of all years lived with disability (YLD) and 13% of disability adjusted life years (DALY). This makes mental illness the largest contributor to global YLD burden only tied with cardiovascular disease for the largest cause of DALY (Vigo et al., 2016).

One of the reasons this population is attributed with so much of the burden of disease is due to the frequent psychiatric hospitalizations that are often accompanied with severe mental illness (Lamb & Bachrach., 2001). Since the Deinstitutionalization Movement of the 1950s, long term hospitalizations have become less frequent. On any given day in 1955, there was an average of 559,000 individuals with severe mental illness living in institutions around the country (Lamb & Bachrach., 2001). In 1998, the number dropped to 57,000 (Lamb & Bachrach, 2001). An unfortunate effect of this movement has been that many of the individuals that once would have been living in these institutions are now homeless, and the mental health community is in a constant struggle to manage their illnesses in the community setting (Lamb & Bachrach).

The widespread reduction in long term hospitalization resulted in a significant increase in what many refer to as the revolving door of mental health care. Instead of staying in the hospital for longer periods of time, many of these patients with SMI instead go through a frequent back

and forth of admission and readmission that can be painful, traumatic and expensive for the patient, family, and community (Fuller, Sinclair, & Snook, 2016).

The rate of rehospitalization for persons with SMI is even more pronounced in Kentucky. The US average psychiatric hospital length of stay according to a report by the Office of Research and Public Affairs is 75 days, but in Kentucky in 2016 it was only 8 days (Fuller et al.). Out of all hospital admissions in Kentucky, 9.4% are 30-day readmissions and 25.3% are 180-day readmissions. This means, over a quarter of all mental health admissions in Kentucky are people who were just released in the past six months (Fuller et al., 2016). Psychiatric in-patient hospitalizations still account for the single greatest direct cost in mental health care in 2013; the US spent $11.5 billion, with $646 million spent on readmissions within 30 days of a previous admission (Fuller et al.).

Increasing treatment adherence and reducing costs such as frequent hospitalizations and emergency room visits is of the utmost concern to all those working in the mental health field. The most crucial way to address these concerns is through the proper care of these patients while they are in the community setting. Current guidelines by the National Institute for Health and Care Excellence (NICE) included the following suggestions for treatment of patients as they transition from the hospital to the community setting (National Institute for Health and Care Excellence, 2016, 1.5-1.6).

- Ensure the aim of care and support of people in transition is person-centered and focused on recovery.
- Support people in transition in the least restrictive setting available.
- Give people with serious mental health issues who have recently been homeless, or are at risk of homelessness, intensive, structured support to find and keep accommodation.

- For people being discharged from hospital, consider a group-based, peer-delivered self-management training program as part of recovery planning.

- Arrange support according to their mental and physical health needs.

Cause and effect diagram related to hospital readmission rates

Appendix A shows a cause and effect diagram of readmission hospitalization rates for persons with SMI, based on the Ishikawa diagram (Tague, 2004), developed to demonstrate the cause and effect of readmissions in individuals with SMI. It demonstrates the process that leads to high readmission rates in the mentally ill. The diagram shows six categories that contribute to high readmission rates: patient issues, provider issues, resource issues, system issues, family issues, and societal issues.

Under patient issues the first listed cause of high readmission rates are drug and alcohol addiction. Drug and alcohol addiction are higher than average in patients with severe mental illness, and patients with comorbid drug and alcohol issues have higher rates of hospital readmission (Šprah, Dernovšek, Wahlbeck, & Haaramo, 2017). ACT services employ substance use specialists that will meet with these patients regularly to help them manage their substance use issues.

The second problem for patients with severe mental illness is poor insight into their own mental health, meaning they do not understand that they need help (Konstantakopoulos, 2019). Therefore, these patients require constant contact with clinicians to prompt and remind them of the importance of their treatment adherence.

According to the Diagnostic and Statistical Manual of Mental Disorders (5th edition) (2013), one of the key symptoms that defines psychosis is disorganized thinking. Often times

SMI patients may not know how to seek help, possibly only getting to a hospital when brought by police, emergency services, or family/friends.

The provider issues relate to the lack of available providers in most areas. There is currently a shortage throughout the country in psychiatric/mental health providers leading to wait times for appointment months away (Malowney, Keltz, Fischer, & Boyd, 2015). Often, appointment times are short in duration (e.g., 15 minutes) with limited follow-up to make sure the patient is getting the help they need (Levin, 2017). The ACT service model is designed to to alleviate this problem by creating teams able to share the treatment responsibility and remove from the que, those patients who can take up so much of outpatient provider's time (Bond & Drake, 2015). This allows other providers to focus on patients with less acute problems, while allowing the ACT teams for provide timely support for persons with SMI who may have more frequent readmission without additional community interventions

Resources constitute another barrier for these patients as many of the SMI have difficulty in meeting their basic needs with housing, food, and employment. ACT services provide these patients with social workers dedicated to finding housing and employment as well as helping them to manage their finances to ensure they have money for food. Additionally, a purpose of the ACT team is to quickly respond to and assist patients with seeking treatment for increasing symptoms when they occur (Bond, & Drake, 2015).

Systemically, barriers lie with changes to mental healthcare that occurred during the deinstitutionalization movement. During that time, due to multiple abuses of this vulnerable population by psychiatric facilities, the government created a system of laws that made it much harder to force patients to get the care they need and keep them in structured hospital settings

(Lamb & Bachrach, 2001). This is what ultimately led to the creation of ACT services in the United States, providing patients with SMI structured care in the least restrictive environment.

The final two categories can be addressed together as societal and familial barriers to care. Mental illness is still overwhelmingly feared and misunderstood by society and the families of those with mental illness (Rüsch, Angermeyer, & Corrigan, 2005). Stigma may make patients and family members hesitant to seek or maintain the treatment that is needed. This may lead to hospitalization to return a patient to a safe mental/physical state rather than effective outpatient/community-based care.

Summary of the Evidence

A literature search was conducted using the databases CINAHL, MEDLINE, PsycINFO, Psychology & Behavioral Sciences Collection, and the DSM-5 Library using the search terms ACT programs, hospitalization and incarceration. Only studies within last 10-15 years were included for review. Of the fifteen studies reviewed seven were cohort studies, seven were randomized control trials, and one was a systematic review of randomized control trials. The studies were predominantly conducted in North America and Europe, while one study occurred in Singapore. All studies utilized a standard $p<0.05$ for determining significance. Four of the studies utilized the Dartmouth Assertive Community Treatment tool to measure fidelity to ACT model (Clausenet al., 2016;Killaspy et al., 2006; Sood, & Owen, 2014;, Young, Barrett, Engelhardt, & Moore, 2014), and the other four did not include a tool to assess fidelity (Dekkeret al., 2002; Dieterich, Irving, Bergman, Khokhar, Park, & Marshall, 2017; Essock et al., 2006; Low, Tan, Lim, Poon, & Lee, 2013).

Hospitalization rates

The largest study was a systematic review of the evidence by Deitherich et al. (2017). The study included a review of 40 randomized controlled trials (RCTs). Deiterich et al. studied ACT and ACT similar programs. They found that when ACT was compared with standard care it slightly reduced the number of days in hospital per month by 0.86 days each month (n = 3595, 24 RCTs, MD −0.86, 95% CI −1.37 to −0.34,). They also found that the more adherent to the ACT model the members of the team were, they saw a decreased in patients' time in the hospital ("organization fidelity" variable coefficient −0.36, 95% CI −0.66 to −0.07); and the higher the baseline hospital use in the population, the better ACT was at decreasing time in hospital ("baseline hospital use" variable coefficient −0.20, 95% CI −0.32 to −0.10).

Several of the RCTs had findings that were similar to Deiterich et al., Dekker and colleagues (2002) demonstrated a 66% decrease in admission days in the ACT group compared with the control group experience of a 34% increase in admission during the same time period. Another study compared a two-year period prior to admission to ACT to their first two years in ACT and found a mean reduction of 58.24 days (p<0.05) (Clauson et al, 2016).

Essock and colleagues (2006) found statistically significant differences in hospitalization between two sites involved in their study over a three-year period. When compared with the ACT group, the standard clinical case management group averaged significantly more days in the hospital (M=41±60 days compared with 32±91 days for the ACT group) and significantly more days institutionalized (hospitalized or incarcerated) (158±254 days compared with 139±262 days; Mann-Whitney U=713, p=.002 and Mann Whitney U=800, p=.02), respectively, for hospitalized and institutional days.

Conversely, Kilaspy et al. (2014) did not find significant reductions in hospital days over the course of a 10-year study, involving 251 participants. In response to this, Sood et al. (2014)

conducted a cohort study as they suggested that the study done by Kilaspy et al. was underpowered making it likely that significant differences among the variables [e.g., hospitalization rates] would not be detected. Sood et al. attempted to compensate for the decreased causative analysis in their cohort design by utilizing change-point and mirror-image analysis. The total number of days per person per year spent in hospital was reduced from a mean of 73 days prior to ACT to 46 days during the same time period when they received ACT services.

A retrospective study by Low et al. in Singapore in 2013 showed a mean number of admissions was 1.9 before ACT and 0.6 after ACT treatment, with mean reduction in number of admissions of 1.3 (p <0.01). The mean length of stay was 72.2 days pre-ACT and 17.1 days post ACT, mean reduction in length of stay was 55.1 days (p <0.01).

Incarceration rates

Dieterich et al. (2017) conducted a systematic review of 11 studies that examined incarceration rates among patients enrolled in ACT compared to those receiving usual out-patient mental health care. The study found no significant differences in rates of incarceration among the ACT patients and control groups; however, they state that this could be due to poor consistency between studies relating to definition of this measure, they recommend further research in this area. Conversely, a study by Van Vugt et al. (2016) did demonstrate a significant decrease in the number arrests and incarcerations (OR = 0.5, z = − 6.5, CI 0.4 to 0.6, p < 0.001). The number of days in detention showed a decrease over time, but this was not significant (β = − 1.1, z = − 0.9, CI − 3.5 to 1.3, p = 0.403).

Gaps in the Literature

The Dieterich et al. (2017) systematic review discussed several gaps in the current literature. They found many studies assessing the same outcomes on different scales making it difficult to compare outcomes across studies. Such as inconsistent reporting of what constituted a 'legal contact', or usage of different scales to measure social adjustment and satisfaction. Future studies should be done to investigate ACT utilizing standardized scales to increase comparability.

One aspect that has been overlooked in most studies is the number of 30-day readmissions in this population. The Federal Hospital Readmissions Reduction Program (HRRP), which took effect in 2012 created penalties for hospitals that have higher than average 30-day readmission rates (Joynt & Jha, 2013). This makes tracking 30-day readmissions an important goal when gathering patient with SMI hospitalization data. Currently, few studies investigated how often patients with SMI are readmitted to the hospital within 30 days. According to a study by the Agency for Healthcare Research and Quality (2012), 15% of patients with mood disorders, and 22.4% of patients with schizophrenia were readmitted within 30 days of discharge from an inpatient psychiatric unit (Heslin, 2015). This represented significant cost and encapsulates the current crisis of care in this population. Currently, there is little research about effective treatment options to prevent frequent readmissions. For this reason, this study assessed 30-day readmission rates in addition to hospitalizations, average number of days spent in the hospital during each admission and incarceration rates to determine if participation in ACT leads to a reduction in any of these variables.

Theoretical Framework

ACT is defined as a program model focused on an integrative team-based approach. As opposed to traditional treatment schemes that involve each aspect of care separately, the ACT as

a conceptual model integrates all aspects of care into a single team that can work together and

respond seamlessly to the patient's needs (Stein, 1980). The model's aim, through the use of a

team-based approach, is to provide care to the patient in their home as opposed to a clinical

setting. Typically, ACT healthcare providers have a small caseload consisting of 10-15 patients

per member of the team. The team implements assertive outreach, attempting multiple "contacts"

with the patient each week. Emphasis from all members of the team is placed on medication

adherence. Additionally, there is a 24/7 emergency coverage available to the patients if their

symptoms worsen or if they become suicidal or homicidal (Stein, 1980).

According to the Dartmouth Assertive Community Treatment (DACT) fidelity tool, each

team should consist of a psychiatrist, nurse, team leader, substance use specialist, and vocational

specialist (Winter, 2000). Aubry (2016) suggested that a housing specialist should be included as

a member of the ACT team.

Purpose Statement

The purpose of this evidence-based scholarly project was to evaluate the effectiveness of an

ACT team, specifically, does length of time in ACT affect the number and/or length of

hospitalizations and incarcerations in patients with SMI. This project assessed hospitalization

and incarceration data for participants with SMI in a southeastern metropolitan city receiving

services at a large community mental health agency.

Methods

Setting and Organization

The ACT team is a branch of a large community mental health agency providing mental

health services to residents of Jefferson County and the surrounding six counties in north central

Kentucky. The parent agency is a not-for-profit health care organization dedicated to delivering

mental health and substance use disorder treatment, education and support to communities in Florida, Illinois, Indiana, Kentucky and Tennessee.

The ACT team is organized into three pods. The pod providing services to inner-city clients was the focus of this evaluation. This pod was the largest of the three pods making up 64 of the 144 total ACT team clients. It was staffed by 2.5 therapists, two employment specialists, one case manager, two peer support specialists, 1.5 community support associates, one business professional, two nurses and one advanced practice register nurse (APRN).

Primary funding for the ACT program came from Medicaid payments and a grant from the Department for Behavioral Health called DIVERTS which is a grant offered to help individuals with SMI to alleviate their frequent contact with law enforcement.

Ethical Considerations and Institutional Review Board

Permissions and approval for this project were obtained from the University of Louisville Human Subjects Protection program and the community mental health agency's institutional review board. The project was deemed to be a non-human subject, quality improvement project. A waiver for consent was not required for this project's program evaluation because no research was conducted

Design

This study was a program evaluation of the ACT Program. There were two different aspects of this study: a) evaluation of data collected by medical record review of ACT patients, covering their first year of participation in ACT services; and b) process evaluation using the Dartmouth ACT fidelity score, which was derived by scoring program metrics provided by ACT staff interviews.

Population

The population included ACT team clients with SMI including diagnoses of schizophrenia, bipolar disorder, schizoaffective, and depression with psychotic features. Participants were at least 18 years of age.

Because this evaluation was meant to cover the first year of ACT involvement exclusion criteria included clients with less than one year of participation with ACT or who had missing hospitalization data within their first year of ACT services. However, after initial data gathering began it became apparent that there were insufficient patient data to make an adequate analysis. Therefore, a second analysis was done that also included a comparison of the first three-month period to the second three-month period expanding the study to include individuals who only had a total of at least six-months of available data.

Measures

In this study, patient data were obtained from patients' electronic medical records for the metro-ACT team to assess the following variables: number of times hospitalized for psychiatric admission; average length of hospital stay; number of 30-day readmissions; and number of incarcerations.

Demographic data were collected including age, gender, diagnosis, and race of the participant. The Dartmouth Assertive Community Treatment Scale (DACTS) was used to assess fidelity. This scale is commonly used to assess ACT programs by rating 26 items on a 5- point Likert scale. The items were grouped according to three broad categories (human resources, organization boundaries, and community services). The human resources items asked questions about the composition of the program staff in terms of professional disciplines and the use of a team approach versus an individualized approach to case management. The organizational

boundaries items addressed issues of responsibility by the treatment program for functions such as intake, crisis services, hospital admissions, and hospital discharges. Service items inquired about location of services, types of services offered, frequency of contact, and involvement with community agencies. For each section, a score of five was considered ideal, a score of 4.2 indicated a well implemented team, and a score of four was considered "good". A score of 3-3.9 was ranked as "fair," and any rating below a score of three was considered to not be consistent with ACT (Substance Abuse and Mental Health Services Administration, 2016).

The DACTS tool has been assessed for reliability and validity by several studies. According to a study done by Teague et al. (1998), they found a Cronbach's alpha of 0.92. Winter et al. (2000) found a Cronbach's alpha of 0.82, which showed that this tool has a high level of reliability. Only one study was found (Bond & Salyers, 2004) that evaluated the validity of the tool and reported a correlation between DACTS fidelity and reduction of state hospital days ($r=.49$, $p=.08$, one-tailed). Few studies were found measuring the validity of the measure. Winter et al. recommended that future studies be performed to confirm the validity of the DACTS. Despite the current lack of validity studies, DACTS remains a commonly tool used.

Data Collection

Measures of hospitalization and incarceration were collected for each participant for the first six months of participation in ACT and compared to the second six-month period. These data were obtained via review of medical records by agency staff and reported to the DNP project evaluator.

Data Analysis

Data were analyzed using paired t-tests to assess enrollment in ACT services had led to significant changes in any of the measures from the three-month baseline of initial enrollment to

the second three months of enrollment. As well as the six-month baseline of initial enrollment to

the second six-months of enrollment in those participants. Correlational matrices were also

performed to analyze the relationships among the variables, and descriptive statistics were used

to describe the population.

Stakeholders

There were multiple stakeholders in this project. Hospital staff and administrators worked

extensively to reduce admissions and length of stay. Law enforcement often struggles with

similar issues, as many mentally ill individuals fill the jail systems. Outpatient providers

(APRNs, psychiatrists, social workers) who worked diligently to manage this group due to the

complexity and intensive patient care needs. Finally, the clients themselves were stakeholders.

ACT can serve as a gold standard to help SMI patients maintain their independence in the

community while still receiving the care they need.

Results

Population Demographics Characteristics

At the time of this evaluation, there were 43 individuals enrolled in the ACT team. Of

those, 19 participants met initial criteria for the project (i.e., enrolled in ACT > 1 year) with

medical records/documentation available to be reviewed that covered their first full year of

enrollment on the ACT team. Due to low recruitment, the inclusion criteria were expanded to

include individuals with at least their first six months of available data. Subsequently, the

participants increase from 19 to 31.. Of these participants, 45.2% were Caucasian (n=14) and

54.7% were African American (n=17). Twenty-three percent of participants were diagnosed

with bipolar disorder, 67.7% were diagnosed schizoaffective, and 9.7% with schizophrenia

diagnoses. Sixty one percent (n=19) identified as male and 39% identified as female. The mean

age of participants was 43.5 years.

The hospitalization and incarceration data for six-month periods are shown in Table 1. Of

the 19 clients who were cared for the ACT team for at least a year, ten (53%) were hospitalized

or incarcerated at least once.

Table 1

First Six and Second Six Months Hospitalizations, Hospital Days, 30-day Readmissions and

Days Incarcerated Means, Ranges and Standard Deviations

Measure (N = 19)	Mean	Minimum	Maximum	Std. Deviation
Hospitalizations 1st six months	0.579	0.00	3.00	0.961
Hospital days 1st six months	5.631	0.00	38.00	10.531
30-day readmissions 1st six months	0.158	0.00	2.00	0.501
Days incarcerated 1st six months	1.824	0.00	23.00	5.814
Hospitalizations 2nd six months	0.263	0.00	2.00	0.562
Hospital days 2nd six months	2.316	0.00	15.00	4.796
30-day readmissions 2nd six months	0.00	0.00	0.00	0.00
Days incarcerated 2nd six months	3.842	0.00	73.00	16.747

The hospitalization and incarceration data for the three-month periods are shown in Table 2. Of the 31 clients who were cared for the ACT team for at least a year, 14 (45%) were hospitalized or incarcerated at least once.

Table 2

First Three and Second Three Months Hospitalizations, Hospital

Days, 30-day Readmissions and Days Incarcerated Means, Ranges and Standard Deviations

Measure (N = 31)	Mean	Minimum	Maximum	Std. Deviation
Hospitalizations 1st three months	0.129	0.00	2.00	0.428
Hospital days 1st three months	3.065	0.00	53.00	10.696
30-day readmissions 1st three months	0.000	0.00	0.00	0.000
Days incarcerated 1st three months	1.710	0.00	47.00	8.474
Hospitalizations 2nd three months	0.323	0.00	2.00	0.599
Hospital days 2nd three months	3.726	0.00	30.00	8.114
30-day readmissions 2nd three months	0.065	0.00	1.00	0.250
Days incarcerated 2nd three months	1.936	0.00	31.00	6.856

Hospitalization Number

A paired samples t-test was conducted to evaluate the impact of participation in the metro ACT team overtime on number of hospitalizations for six-month data (table 3) and three-month data (table 4). Mean hospitalization numbers did not change significantly from the first six-month period (0.5789 ± 0.96124) to the second six-month period (0.2632 ± 0.56195), t(18) =

1.679, p=0.111) Mean decrease of 0.31579 with a 95% CI between -0.07947 and 0.71105. The magnitude of effect was large (eta squared =0.135). The mean hospitalization number however, did change significantly from the first three-month period (0.1290 ± 0.42755) to the second three-month period (0.3226 ± 0.59928), (t(30) = -2.257, p=0.031). Mean increase of 0.19355 with a 95% CI between -0.36868 and -0.0184. The magnitude of effect was large (eta squared =0.145).

Number of Hospital Days

A paired samples t-test was conducted to evaluate the impact of participation in the metro ACT team over time on number of hospital days number for the six-month data (table 3) and the three-month data (table 4). Though the mean number of hospital days did not change significantly from the first six-month period (5.6316 ± 10.53149) to the second six-month period (2.3158 ± 4.79644), t(18) = 1.448, p=0.165), a downward trend was noted, as there was an average decrease of 3.31579 with a 95% CI between -1.49347 and 8.12505. The magnitude of effect was medium (eta squared =0.104). The mean number of hospital days did not change significantly from the first three-month period (3.0645 ± 10.69559) to the second three-month period (3.7258 ± 8.11361), t(30) = -0.381, p=0.706). A mean increase of 0.66129 with a 95% CI between -4.20475 and 2.88217 was found. The magnitude of effect was small (eta squared =0.005).

30-Day Readmissions

A paired samples t-test was conducted to evaluate the impact of participation in the metro ACT team overtime on 30-day readmission rates for the six-month data (table 3) and three-month data (table 4). The mean rate of 30-day readmissions did not change significantly from the

first six-month period (0.1579 ± 0.50146) to the second six-month period (0.00 ± 0.00), (t(18) =

1.372, p=0.187), though there was a mean decrease of 0.15789 with a 95% CI between -0.08380

and 0.39959. The magnitude of effect was medium (eta squared =0.095). The mean rate of 30-

day readmissions also did not change significantly from the first three-month period (0.000 ±

0.0000) to the second three-month period (0.0654 ± 0.24973), (t(30) = -1.438, p=0.161). A mean

increase of 0.06452 with a 95% CI between -0.15612 and 0.02709 was found. The magnitude of

effect was medium (eta squared =0.064).

Incarcerations

A paired samples t-test was conducted to evaluate the impact of participation in the metro

ACT team over time on number of incarcerations number for the six-month data (see Table 3)

and the three-month data (table 4). The mean number of incarcerations did not change

significantly from the first six-month period (1.8421 ± 5.81438) to the second six-month period

(3.841 ± 16.74735), (t(18) = -0.48, p=0.637). A mean increase of 2.000 with a 95% CI between -

10.74536 and 6.74536 was found. The magnitude of effect was large (eta squared =0.135). The

mean number of incarcerations also did not change significantly from the first three-month (see

Table 4) period (1.7097 ± 8.47425) to the second three-month period (1.9355 ± 6.85534), (t(30)

= -0.246, p=0.807) with a mean increase of 0.22581 with a 95% CI between -2.10024 and

1.64862. The magnitude of effect was small (eta squared =0.002).

Table 3

Comparison of First Six and Second Six Months Hospitalizations, Hospital Days, 30-day

Readmissions and Days Incarcerated

Measure (N = 19)	Mean	Confidence Interval	T	P Value
Hospitalizations	-0.31579	0.079 to -0.711	-1.679	0.111
Hospital days	-3.31579	1.493 to -8.120	-1.448	0.165
30-day readmissions	-0.15789	0.083 to -0.399	-1.372	0.187
Days incarcerated	2.00000	10.745 to -6.755	0.480	0.637

Table 4

Comparison of First Three and Second Three Months Hospitalizations, Hospital Days, 30-day

Readmissions and Days Incarcerated

Measure (N = 31)	Mean	Confidence Interval	T	P Value
Hospitalizations	0.19355	0.086 to -0.369	2.257	0.031
Hospital days	0.66129	4.205 to -2.882	0.381	0.706
30-day readmissions	0.06452	0.156 to -0.027	1.438	0.161
Days incarcerated	0.22581	2.100 to -1.649	0.246	0.807

Correlations

The relationship between each of the project variables was investigated using Pearson's

correlations coefficient. Of the variables assessed, a medium strength correlation was found

between participant age and number of hospitalizations in the second three-month period

(r=0.373; p<0.05), as well as number of hospital days in the second three-month period (r=0.392;

p<0.05). A medium strength correlation was found between number of hospitalizations in the

first three-month period and number of hospitalizations in the second three-month period

(r=0.423; p<0.05). A strong correlation was found between number of hospitalizations in the first

three-month period and number of hospital days in the second three-month period (r=0.50;

p<0.01), and number of 30-day readmissions in the second three-month period (r=0.622; p<0.01).

DACTS score

The last review of DACTS rating of the metro ACT (see Table 5) occurred in Fall 2018. The overall fidelity rating was 3.9 out of 5. The Human Resources subscale fidelity rating was 4.2 out of 5. The Organizational Boundaries subscale rating was 4.1 out of 5. The Nature of Services subscale fidelity rating was 3.4 out of 5.

Table 5

Ratings of Dartmouth Assertive Community Treatment Scale (DACTS) by Components

Variable	Item Ratings
Small Caseload	5/5
Team Approach	5/5
Program Meeting	5/5
Practicing Team Leader	5/5
Continuity of Staffing	4/5
Staff Capacity	4/5
Psychiatrist on Staff	3/5
Nurse on Staff	5/5
Substance Abuse Specialist on Staff	1/5
Vocational Specialist on Staff	4/5
Program Size	5/5
Human Resources Total (average)	46(4.2/5)

Table 5 (Continued)

Ratings of Dartmouth Assertive Community Treatment Scale (DACTS) by Components

Variable	Item Ratings
Explicit Admission Criteria	4/5
Intake Rate	5/5
Full Responsibility for Treatment Services	4/5
Responsibility for Crisis Services	5/5
Responsibility for Hospital Admissions	4/5
Responsibility for Hospital Discharge Planning	3/5
Time-Unlimited Services (Graduation Rate)	4/5
Organizational Boundaries Total (average)	29(4.1/5)
Community-Based Services	5/5
No Dropout Policy	5/5
Assertive Engagement Mechanisms	4/5
Intensity of Service	3/5
Frequency of Contact	3/5
Work with Informal Support System	2/5
Individualized Substance Abuse Treatment	3/5
Dual Disorder Treatment Groups	1/5
Dual Disorders (DD) Model	3/5
Role of Consumers on Treatment Team	5/5
Nature of Services Total (average)	34(3.4/5)
Total DACTS (average)	109(3.9/5)

Discussion

Interpretation

Though the findings of this project involving participation in ACT did not find a significant decrease in number of hospital days and incarcerations, and 30-day readmission rates, it did note a downward trend in the number of hospitalizations in the first three months compared to the second three months data.

The three months mean hospitalizations increased significantly from the first three-month period to the second three-month period. This finding is contrary to the expected results and may be explained by the cyclical nature of major mental illnesses that the clients were diagnosed with. As such it is possible that regardless of intervention some patients will decompensate as a normal part of their disease trajectory. It is important to note that the data collected were for the first six-month period in ACT, and it is likely that this timeframe is too brief of a period to analyze and subsequently the full benefit of enrollment in ACT services had not been realized. Significant findings were not found in any of the project measures (i.e., number of hospitalizations and incarcerations, hospital days, and readmission rates) for the six-month time period. These findings are consistent with Kilaspy et al. (2014) who also found no significant reductions in hospital days over the course of a 10-year study, involving 251 participants. As identified in Kilapsy's study, lack of significance in outcome measures is likely due to relatively small number of participants and brief length of time assessed. Dieterich et al. (2017) who did find significant decreases in hospitalizations, had a significantly larger sample and conducted a randomized control trial which points to a more robust study design.

Though mean hospitalizations were not found to be statistically significant, it is important to note that there was a downward trend in hospitalizations from the first six months to the second six months. This suggests that participation in ACT does have a positive impact on SMI clients.

An examination of relationships among the variables found a medium strength positive correlation between participant age and number of hospitalizations in the second three-month period (r=0.373, p<0.05) as well as number of hospital days in the second three-month period (r=0.392, p<0.05). These findings suggest that as age of the client increases the likelihood of requiring in-psychiatric hospitalizations occurs, this is consistent with other research that suggests that increasing age was associated with increased hospital utilization often due to increased physical complications that impact their mental health (Toh, Lim, Yap, & Tang, 2017).

There was also a medium strength positive correlation found between number of hospitalizations in the first three-month period and number of hospitalizations in the second three-month period (r=0.423, p<0.05), as well as a strong correlation between number of hospitalizations in the first three-month period and number of hospital days in the second three-month period (r=0.501, p<0.01) and number of 30-day readmissions in the second three-month period (r=0.622, p<0.01). These findings suggest that individuals who were initially heavy utilizers of hospital resources were more likely to be heavy utilizers in proceeding months. Research suggests that the best indicator of an individual being hospitalized in the future is a history of frequent hospitalizations and is consistent with previous studies' findings by Greenwald and Jack (2009) who found that prior utilization was a good predictor of future use.

Fidelity Findings

The DACTS scores for the metro ACT team were considered to be fair to good across the range of measures with nature of service receiving the lowest rating- 3.4. Three categories scored below three; 'dual diagnosis model'=1/5, substance use specialist on the team=1/5, and 'work with informal support system'=2/5. These factors suggested that this program lacks adequate substance use support, but not enough to disqualify it from being considered ACT level of care. According to a systematic review conducted by Dieterich et al., (2017), increasing fidelity to the ACT model of care was associated with reduction in measures of hospitalization and length of stay. The lack of adequate substance use support on the meto ACT may have impacted the projects findings. Research suggests that addressing substance use disorder leads to increased reductions in hospitalizations and length of hospital stays (Clauson et al, 2016; Sprah, 2017).

Limitations

There were several limitations in this project. Initially the assessment involved collecting baseline data from prior to admission to ACT services, however this data was not available to analyze. It is possible that a full complement of data would have allowed for a comparison of the study variables (e.g., number of hospitalizations, hospital days, readmissions) from prior to the time the client was not associated with ACT services and receiving usual outpatient treatment to the time period when the client received treatment provided by ACT services. Other limitations included the short evaluation timeframe and small sample size. A longer time frame - comparing a full year of enrollment in ACT to a second year would have allowed for a more comprehensive assessment of the ACT program. Also, such confounding factors as time of year, holiday season, access to shelter during extreme temperatures, and normal cyclical natures of mental illness which may have had an impact on the project findings could have been controlled

for. Increasing the sample size to ensure adequate power in the project would have improved the likelihood of detecting differences overtime.

Conclusion

Severe mental illness is a worldwide problem. Treatment of this population requires special focus that can be provided by ACT services. This program evaluation aimed to determine if participation in ACT services had led to meaningful improvements in clients' quality of life, by assessing rates of hospitalization, lengths of hospitalization, 30-day readmissions, and incarcerations. Although the project did not find significant results, it did find a downward trend in hospital utilization.

The project also found a deficit associated with the ACT program related to lack of substance use treatment provided. It could be that better adherence to ACT fidelity in this area would lead to increased reductions in hospitalization and incarceration measures.

This project points to several important metrics that are recommended to be collected by the metro ACT team going forward.

Recommendations for sustainability: During the intake process into ACT services, it is recommended that detailed records/information about patients' prior hospitalizations, hospital days, 30-day readmissions, and incarcerations for a one-year period prior to enrollment in ACT be collected. Thirty-day readmission data is extremely valuable information for both hospitals and insurance organizations as it is used as benchmark during cost analysis. Demonstrating that metro ACT team can reduce this variable overtime as compared to outpatient treatment could potentially lead to increased investment into the ACT program.

Severe mental illness is a lifelong often degenerative condition that requires extensive social, cognitive, and pharmacological support to make meaningful improvement in patients'

lives. It could be that this project was unable to find significance due to it's one-year time period, and that one year of enrollment in ACT services is not an adequate timeframe to evaluate the efficacy of the program. It is therefore the recommendation of this project that there be follow up studies that include larger samples and incorporate a longer timeframe to evaluate core measures [e.g., hospitalizations, hospital days, readmission rates, incarceration events/days].

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Appendix A

CAUSE AND EFFECT DIAGRAM

Institute for Healthcare Improvement Open School

Name: Rex Dewan

University/Organization Name: Assertive Community Treatment Centerstone

Project Title: Louisville ACT team Program Evaluation

Health System Sponsor Name:

Team Members: Rex Dewan, Centerstone

Patients

Drug and alcohol addiction

Patients lack insight to their condition

Patient's only know to go to hospital for help

Difficult to legally compel treatment

Regulations against keeping patients long term inpatient

Providers

Long wait times to see providers

Short time to spend with each patient

Poor follow-up on patients who stop coming in

Distrusts or is afraid of patient

Unwilling to help patient

Negative family dynamics

Resources

Can't find housing

Can't find employment

Can't find food

Lack of funding towards mental health awareness and treatment

Large stigma against mental illness

Effect

High Rates of Readmission in the Severely Mentally Ill

Systems

Family

Society