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Risk Factors Leading to Increased Recidivism Rates among Adolescents Admitted to an Acute Care Child and Adolescent Psychiatric Hospital

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Risk Factors Leading to Increased Recidivism Rates among Adolescents Admitted to an Acute
Care Child and Adolescent Psychiatric Hospital

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Project

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Abstract

The purpose of this study is to identify risk factors that may increase recidivism among adolescents admitted to an acute child and adolescent psychiatric hospital. A chart review was performed on 98 adolescent clients admitted to an acute psychiatric hospital, in order to gather data on the potential risk factors of gender, length of stay, diagnoses, living situation, history of a suicide attempt, history of self-harming behavior, history of trauma and abuse, reason for admission, history of previous admissions, presence of outpatient services, and family mental health history. Clients readmitted to the hospital within a 12 month time frame were compared to clients who were not readmitted during that 12 month period. History of self-harming behaviors, and length of stay greater than 5 days were found to be risk factors for recidivism in a primary analysis, while self-harming behavior and history of trauma and abuse were found to be significant risk factors for recidivism during a sub analysis. It is recommended that adolescent clients admitted to a psychiatric hospital with a history of self-harming behavior, extended length of stay, and history of trauma and abuse be identified and that personalized treatment plans are developed for preventing repeat hospitalizations.

Introduction

Suicide is the third leading cause of death in adolescents and young adults in the United States, with suicidal behavior peaking in adolescence (Brent, McMakin, Kennard, Goldstein, Mayes, & Douaihy, 2013). Suicidal and self-harming behavior is often chronic, with an estimated 15% - 30% of adolescents who attempt suicide having a second suicide attempt within a year (Brent et. al., 2013). Long term mental health issues in children and adolescents may lead to failure at school, engagement in law breaking activities, unplanned pregnancy, increased risky behaviors, and adult psychiatric disorders (Carlisle, Mamdani, Schachar, & To, 2012). To date, there are no proven treatments for preventing recurrent suicide attempts in adolescent populations, with some observational data indicating that the implementation of mental health services may not safeguard against recurrent suicide attempts (Brent et al., 2013).

Currently, children and adolescents are not hospitalized in an acute psychiatric facility unless they are deemed a threat towards themselves or towards others (Sharfstein, 2009). Once hospitalized, the focus of treatment is on stabilization with a major component of stabilization including the use of psychotropic medications to achieve stabilization (Sharfstein, 2009). However, studies indicating high recidivism rates among children and adolescents admitted to an acute psychiatric setting indicate that many children and adolescents continue to experience crisis upon discharge from an acute psychiatric hospital, leading to the question of whether or not these individuals are being discharged prematurely (Sharfstein, 2009). As suicide is the third leading cause of death among adolescents in the United States, it is imperative to provide effective and timely acute care treatment to adolescents who experience suicidal thoughts (Brent et al., 2013).

Statement of the Problem

The purpose of this study is to identify risk factors that may lead to increased recidivism rates among adolescents admitted to an acute care child and adolescent psychiatric hospital, in order to assist mental health providers with stabilizing and maintaining the safety of this at risk population. Risk factors examined for this study based on previous literature include length of stay, presence of outpatient services, gender, diagnoses, living situation, history of trauma, family psychiatric history, reason for admission, history of a previous admission, history of self-harming, and history of a suicide attempt.

It is hypothesized that length of stay over 5 days, a depressive disorder diagnosis, female gender, living in a non-nuclear family, the presence of a previous hospitalization, the presence of a prior suicide attempt, the presence of self-harming behavior, a prior history of trauma, a family history of mental illness, and a presenting problem of a suicide attempt will all be risk factors for increased recidivism among adolescents admitted to an acute care child and adolescent psychiatric hospital.

Review of the Literature

In the last several decades there has been a shift of focus on providing the majority of mental health services in community outpatient care versus inpatient care. This transition is reflected by the decreased average length of stay in an acute psychiatric hospital setting for children and adolescents, which has decreased from 12.2 days to 4.5 days between 1990 and 2000 (Carlisle et al., 2012). Studies regarding the impact of the average length of stay during an acute hospital stay and recidivism are conflicting. In a study conducted by Fontanella (2008) and

James, Charlemagne, Gilman, Alemi, Smith, Tharayil, and Freeman (2010), children and adolescents with longer lengths of stay were more likely to be readmitted to an acute psychiatric facility than children and adolescents with shorter lengths of stay. However, a study conducted by Case, Olfson, Marcus, and Siegel (2007) indicated that shorter inpatient hospitalizations led to increased rates of recidivism among children and adolescents.

Studies by Blader (2004), Fontanella (2008) and Goldston, Reboussin, Kancler, Daniel, Frazier, Harris, Kelley, and Reboussin, (2003), indicate that the majority of readmissions to an acute child and adolescent psychiatric facility occur 30 -90 days after discharge. It is estimated that 33% - 38% of children and adolescents are readmitted to an acute psychiatric facility within a year after discharge (Carlisle, Mamdani, Schachar, & To, 2012). In a study conducted by James et al., (2010), 186 children and adolescents were followed for a time span of 30 months after discharge from an initial psychiatric hospitalization. Results of the study indicated that the risk for rehospitalization among children and adolescents is the highest during the first thirty days after discharge from a psychiatric hospital (James et al., 2010). During the 30 day time span after discharge, 9% of clients were readmitted, with 15% of clients being readmitted after 60 days, 19% of clients being readmitted after 90 days, 32% of clients being readmitted after 1 year, and 43% of clients that were discharged from a psychiatric hospital after an initial hospitalization being readmitted within two and a half years after discharge (James et al., 2010).

Many healthcare professionals may assume that participating with outpatient services would be a deterrent to recidivism among children and adolescents who have been discharged from a psychiatric facility, but the research on this topic is mixed as well. Studies by Blader (2004) and Carlisle et al. (2012) indicate that clients who attend outpatient services are more likely to need rehospitalization compared to their counterparts who do not participate in

outpatient services after discharge. Carlisle et al. (2012) discovered that participating with outpatient services after discharge increased the likelihood of readmission to an acute psychiatric hospital to 38%. Conflictingly, a study conducted by King, Hovey, Brand E., & Ghaziuddin, (1997) found that participation with outpatient medication management services decreases depression in children and adolescents who have been hospitalized. In a study by Romansky, Lyon, Lehner, and West (2003), 500 randomly selected children and adolescents who had been previously hospitalized in a psychiatric hospital and were in the child welfare system were examined. The results of the study indicated that children and adolescents who participated in more aftercare services were less likely to be rehospitalized than children and adolescents who did not participate with aftercare services upon discharge from an acute psychiatric hospital.

Research by James et al., (2010) evaluated the modes of outpatient services that were being attended by children and adolescents who were discharged from an acute psychiatric facility after their first acute hospitalization. These services included partial hospitalization, intensive outpatient services, non-intensive outpatient services (standard therapy services as well as medication management services), or no support services in place. Findings of the study indicated that 68.8% of clients who participated in a combination of intensive and non-intensive outpatient services and 69.2% of clients who participated in non-intensive outpatient services did not require a second hospitalization. Sixty five percent of clients who participated in only intensive outpatient services and 63.5 % of clients who did not receive any psychiatric services upon discharge were readmitted for a second acute psychiatric hospitalization during the 30 month time span of the study. The study conducted Goldston et al. (2003) indicates that only 73% of clients discharged from acute care actually participate with outpatient services, and that only 65% of clients continue with outpatient services for at least six months. Goldston et al.

(2003) indicates that the presence of a parent in the household coincides with an increased likelihood of the client participating with outpatient services upon discharge.

The findings from studies conducted by James et al. (2010) and Carlisle et al. (2012) indicate that rehospitalization among children and adolescents is most consistently predicted by clinical factors such as diagnoses, co-morbidity, and suicidal behavior. Non-suicidal self-injury among adolescents is often a strong predictor of having a future suicide attempt, while having a prior suicide attempt and self-harming behavior are strongly associated with suicidal-death (Ougrin, Tranah, Stahl, Moran, & Asarnow, 2015). Consoli, Cohen, Bodeau, Guilé, Mirkovic, Knafo, Mahe, Laurent, Renaud, Labelle, Breton, and Gérardin, (2015), found that indicators for an increased risk of rehospitalization included having increased levels of depression and hopelessness. Consistent with this finding, Consoli et al. (2015) discovered that clients diagnosed with Major Depressive Disorder were most likely to be rehospitalized within a six month long period compared to clients with other diagnoses. Research conducted by Blader (2004), King, Hovey, Brand, & Ghaziuddin (1997) and Fontanella (2008) findings revealed that clients with increased aggressive behaviors and conduct problems are more likely to need repeat hospitalizations than peers with other diagnoses.

Living situation and family dynamics may also play a role in rehospitalization among children and adolescent populations. In a study conducted by Blader (2004), results supported that having parents who were involved with their child's care upon discharge from an acute psychiatric hospital was an indicator of a decreased risk for rehospitalization. Goldston et al. (2003) discovered that the presence of a biological parent at home was a positive indicator for participating with outpatient services. Fontanella (2008)'s research indicates that a prior history of residing in a residential treatment center may be a risk factor for readmission to an acute child

and adolescent hospital, as well as being discharged into a foster care or group home setting. The findings also indicated that younger clients with a history of violence, past abuse, or severe psychiatric disturbance were more likely to be readmitted to an acute psychiatric hospital than children and adolescents without a trauma history (Fontanella, 2008).

Methods

Setting

The study was conducted at a 52 bed acute care child and adolescent psychiatric hospital located in the Midwest region of the United States. The hospital is located in the most affluent county of the state. The acute care psychiatric hospital provides medication management and therapy services to children and adolescents who are admitted to the hospital for acute criteria, including suicidal ideations, homicidal ideations, audio hallucinations, and visual hallucinations. The focus of the hospitalization is promoting and maintaining the client's safety, initiating a course of treatment, and allocating outpatient resources for continuing treatment and maintenance of the client's safety upon discharge. The average length of stay at this child and adolescent psychiatric hospital is 3 to 5 days.

Population and Procedures

Participants consisted of adolescent clients between the ages 13 to 18 years; who were admitted to the hospital in January of 2014. The total sample consisted of 98 individuals, 30 of which were male, and 68 of which were females. Institutional Review Board (IRB) approval was gained from both Lincoln Memorial University (LMU), and the medical center at which the study was conducted, prior to conducting the study. Information on each client was gained by a retroactive chart review. The charts of each individual were reviewed, emphasis being paid to the client's initial psychiatric evaluation and discharge summary. Data was collected by the retro

chart review, analyzing 11 variables that may be possible risk factors for recidivism; length of stay, gender, diagnoses, living situation, history of a suicide attempt, history of self-harming behavior, history of trauma and abuse, reason for admission, history of previous admission, presence of outpatient services, and family mental health history. Upon completion of the data collection a search was conducted in the electronic medical record to determine if a client was readmitted to the hospital within a 12 month period after the client's admission in January of 2014. Clients who had been readmitted to the hospital in the 12 month period after January 2014 were then compared to the clients who had not been readmitted to the hospital after January 2014 in a primary analysis via a multivariate logistic regression, in an effort to identify risk factors that may lead to readmission among the adolescent population. Following the primary data analysis, a second sub analysis was conducted using multivariate logistic regression. The sub analysis compared two groups.

The first group consisted of clients who were admitted to the hospital for the first time in January of 2014 and were not readmitted within a 12 month period. The second group consisted of clients who were admitted to the hospital in January of 2014 and later readmitted to the hospital during the next 12 months, as well as clients who were not readmitted to the hospital in the next year, but their admission to the hospital in January of 2014 was not their first admission to the hospital (i.e. the client did have a past history of recidivism at this specific hospital, but was not readmitted during the 12 month time period analyzed by the study). The sub analysis was conducted in an effort to enhance the exploration of possible risk factors for recidivism among the adolescent population being studied.

Possible Risk Factors

The category of gender consisted of biological male or female gender. Clients who identified as transgendered were not included. Every diagnoses assigned to a client was included (as opposed to just the client's primary or first labeled diagnosis). Categories of diagnoses included; depressive disorders (which includes all subtypes of depressive disorders such as major depressive disorder or an unspecified depressive disorder), anxiety disorders (which includes all subtypes of anxiety disorders such as generalized anxiety disorder, social anxiety disorder, and unspecified anxiety disorders), psychotic disorders (which includes all psychotic disorders such as brief psychotic disorder and unspecified psychotic disorders), personality disorders (which includes all type B personality disorders such as borderline personality disorder and histrionic personality disorder), Post-Traumatic Stress Disorder (PTSD), mood disorder, not otherwise specified, substance abuse (which includes any type of substance abuse such as marijuana use disorder, alcohol use disorder, polysubstance abuse, etc.), and Attention Deficit Hyperactivity Disorder (ADHD). A ninth category was created labeled "Other" which included the diagnoses of Autism Spectrum Disorder, Bipolar Mood Disorder, Oppositional Defiant Disorder, Reactive Attachment Disorder, Eating Disorders, and Conduct Disorder.

Living situation was broken down into the categories of living with a nuclear family; which was defined as a family consisting of at least one biological parent and either a second biological parent or a step-parent, biological mother, biological father, adoptive family, foster care, grandparents, living with another biological relative, or living in a residential facility. Self-harming behavior was defined as any self-perpetuated action meant to cause non-lethal harm to one's person, primarily including the behaviors of scratching, cutting, or burning one's self. The category of trauma and abuse includes having any past history of physical, sexual, or emotional

abuse. Reason for admission was broken up into six subcategories that consisted of suicide attempt, suicidal ideations, homicidal ideations, psychosis, mania, and increased aggressive behaviors. The category of history of previous admission consisted of whether or not the client had a history of being admitted to the specific hospital being studied prior to the client's admission in January of 2014. Presence of outpatient services was defined as either one of the following; no outpatient services in place, medication management services only, therapy services only, or medication management and therapy services in place. Family mental health history included whether any biological family member on the maternal or paternal side of the client's family had a history of mental health issues.

Data Storage

Data from the study were collected and archived using the Research Electronic Data Capture (REDCap) tool. REDCap is a secure, on-line application designed to support data collection for research studies. REDCap provides an interface for validated data entry, audit trails for tracing data handling and export procedures, automated export procedures for data downloads to statistical packages, and processes for importing data from external sources (Harris, Taylor, Thielke, Payne, Gonzalez, and Conde, 2009). Each client's data was randomly assigned a data entry number, and no identifying information was documented in the data entry log, in an effort to maintain the anonymity of each client.

Results

Statistical Analysis Methods

Data collected for the study was summarized based on the readmission status of the clients included in this study. Initial univariate analysis was performed to identify variables that were significantly different between the readmitted and non-readmitted groups. Categorical data

was analyzed utilizing Fisher's exact test and ordinal data was analyzed utilizing Wilcoxon-Mann Whitney Tests. P values <0.05 were considered significant. A multivariate analysis with logistic regression was used to determine the effect of each significant variable on readmission to the hospital in 2014. Initial logistic regression utilized variables that had a p value less than 0.2, which were included in the initial model. The model was optimized by removing variables that were determined not to be significant by logistic regression and compared to a subsequent model(s) with the variables removed to investigate confounding factors. Acceptance of a variable for inclusion in the model was a p value less than 0.1 as a significant covariate or a change in a remaining covariate coefficient of 15% for confounding variables. At the end of the iterative process, the optimized model was used to calculate the odds ratios and 95% confidence intervals for significant covariates. All data analysis was performed utilizing the R studio environment using R version 3.2.5.

R is a free use online system used for statistical computation and graphics (R Core Team, 2016). Statistical analyses that can be run on R include linear models, nonlinear regression models, generalized linear models, parametric and nonparametric tests, and graphical design, amongst other features (R Core Team, 2016). R was originally designed by Ross Ihaka and Robert Gentleman in 2008 at the Department of Statistics at the University of Auckland in New Zealand (R Core Team, 2016). R continues to be modified and updated on a regular basis.

Primary Analysis

A total of 98 clients were admitted to the hospital in January 2014 with 26 clients being readmitted within the 12 month time period observed for this study. Table 1 summarizes the data based on whether the client was readmitted to the hospital within 12 months of January 2014, gender, diagnosis, the average number of diagnoses, outpatient treatment services in place, living

situation, length of stay, reason for admission, and relevant psychiatric medical history. Figure 1 shows the distribution of ordinal data with box and whisker plots demonstrating the median, upper and lower quartiles, outliers, and maximum and minimum values. Univariate analysis identified the following variables as having a significant difference between readmitted and non-readmitted clients; diagnosed with ADHD (42% readmitted vs. 21% not readmitted, $p = 0.041$), length of stay (6 days vs. 5 days, $p = 0.014$), and a history of self-harm (85% vs. 58%). Other variables that were not significant but displayed near significance were also investigated, including reason for admission ($p=0.13$) and a history of trauma (0.1622). The variables of self-harm, length of stay, ADHD diagnosis, history of trauma, and reason for admission were included in the multivariate analysis. All other variables were excluded from multivariate analysis since no significant difference was identified in the univariate analysis.

To simplify interpretation of any odds ratios, length of stay was dichotomized to classify clients as having hospital stays greater than 5 days or 5 days or less. Optimization of the multivariate logistic model found that the variables of reason for admission, diagnosis of ADHD, and history of trauma did not have a significant confounding effect on the model and were excluded. Table 2 displays the results from the multivariate analysis. Length of stay greater than 5 days (odds ratio [OR]: 6.23; 95% Confidence Interval (CI): 2.28 -18.66) and a history of self-harm (OR: 5.54; 95% CI: 1.73 – 22.2) were found to increase the odds of readmission within the 12 month time period assessed, as the readmission rate was substantial for this client population. Clients that were followed for the duration of the study period had a readmission rate of 26.5%; however only the variables of self-harm and length of stay were identified as significant factors in increasing the risk of readmission. It should be noted that several variables assessed during the study had substantial differences in proportions between the readmitted and non-readmitted

clients; however these differences were found to be non-significant. Additionally, the ORs calculated for each variable in tables 1 and 2 have wide confidence intervals creating difficulty in understanding the reason(s) a client is at risk for readmission. These were likely due to the limited client population that comprised the readmitted group.

One variable of interest that had a substantial but non-significant difference was having a past history of psychiatric hospitalization. Previous research findings suggest that a history of readmission would be an indicator of increased risk of readmission. Additionally, clients that were admitted in the initial month of the study period that had a history of previous hospitalization were technically being readmitted.

The design of the study did not allow for the duration between readmissions to be assessed or consider if a client was admitted in the 12 months prior to the study, potentially creating bias in the original dataset. As the primary purpose of this study was to assess readmission risk without concern for time between admissions, a sub analysis was performed that reorganized the data to include clients with a history of hospitalization in the readmission group. This reorganization delineates between clients that have been hospitalized at this specific hospital more than once for mental health issues.

Sub Analysis

The reorganization of the data resulted in 50 clients in the readmitted group and 48 clients in the not readmitted group. Table 3 summarizes the study variables for each group and Figure 2 displays the distribution of ordinal variables with box and whisker plots. Univariate analysis of the study variables identified number of diagnoses, diagnosis as “Other” and ADHD, outpatient treatment, clients living with nuclear family, length of stay, history of self-harm, and history of trauma/abuse as having significant differences between the two groups. To simplify

the model and interpretation of odds ratios, the following considerations were made. The diagnoses of ADHD and “Other” were excluded from the model due to the sometimes subjective nature of diagnoses and inclusion of multiple diagnoses in the “Other” category. Instead, the number of diagnoses for each client was calculated and a dichotomous variable was created to identify clients with multiple diagnoses. Seventy eight percent of clients in the readmitted group had at least 2 diagnoses compared to 47% of clients in the non-readmitted group. Outpatient treatment was limited to assessing clients with both therapy and medication compared to clients with no services in place, only therapy, or only medication management services in place. Eighty percent of clients in the admitted group received both medication management and therapy services compared to 48% of non-readmitted clients. Length of hospitalization was dichotomized utilizing a threshold approach with the data as greater than five days after review of the distribution of length of hospitalization in Figure 2. This was also done in the primary analysis. Fifty four percent of clients in the readmitted group had hospital stays that were 6 days or longer compared to 29% in the non-readmitted group. Multivariate logistic regression was performed utilizing the significant variables.

Living with a nuclear family and multiple diagnoses were removed from the model after confirmation that the variables did not confound the coefficients determined for the other significant variables. Table 4 summarizes the outcomes of the multivariate regression. A history of self-harm (OR: 4.48; CI: 1.64 to 12.33; $p = 0.0069$) and trauma (OR: 4.33; CI: 1.64 to 12.33, $p = 0.0041$) were both found to significantly increase the odds of multiple hospitalizations at an acute psychiatric hospital. Near significant increases in odds of readmission were observed for length of admissions greater than 5 days ($p = 0.060$) and combined treatment in the outpatient clinic ($p = 0.0502$). The odds ratio for combined outpatient treatment was determined to be 2.76

(CI: 1.01 to 7.83). As the lower bound of the 95% confidence interval is above 1, a significant association with increased odds of readmission with combined outpatient treatment is supported. The odds ratio for length of admission greater than five days was 2.63 (CI: 0.98 – 7.49; however no significant association with increased odds of readmission is supported because the confidence interval includes 1.

Summary

A history of self-harm and the duration of hospitalization were associated with increased odds of readmission in both the primary and sub analyses, supporting these variables as risk factors for acute psychiatric hospital readmission among adolescents. A history of trauma\abuse was identified to increase the odds of readmission in the sub analysis, and combined medication management and outpatient therapy services resulted in a very near significant effect on odds of readmission with a confidence interval that was above one. Both variables may be risk factors for readmission; however the significance is only supported in the sub analysis.

Tables 5 and 6 summarize the diagnoses originally classified as “Other”. While no significant differences were noted for the distribution of clients in the primary analysis, Autism Spectrum Disorder (ASD) and Bipolar Mood Disorder (BMD) were both determined to be significant in the sub analysis. Note the large CI on the odds ratio indicate a need for additional research relevant to these diagnoses to understand how they may or may not affect readmission risk.

Table 1: Summary of Data for Primary Analysis

	Readmitted		Not Readmitted		Odds Ratio (95% CI)	P-Value
Gender						
Male	7	27%	23	32%		
Female	19	73%	49	68%	1.27 (0.47-3.46)	0.81
Diagnosis						
Total Diagnoses, Median	2.00		2.00			0.44
Depression	5	19%	13	18%	1.08 (0.34-3.40)	1
Anxiety	5	19%	19	26%	0.66 (0.22-2.01)	0.598
Psychosis	0	0%	1	1%	0.00	1
Personality Disorder	2	8%	7	10%	0.77 (0.15-3.99)	1
PTSD	5	19%	10	14%	1.48 (0.45-4.81)	0.53
Mood Disorder, Not Specified	17	65%	53	74%	0.68 (0.26-1.77)	0.454
Substance Abuse	2	8%	6	8%	0.92 (0.17-4.86)	1
Other	6	23%	17	24%	0.97 (0.34-2.81)	1
ADHD	11	42%	15	21%	2.79 (1.06-7.31)	0.041
Outpatient Treatment						
None	4	15%	11	15%	1.01 (0.29-3.50)	0.44
Medication	0	0%	7	10%		
Therapy	3	12%	10	14%		
Medication and Therapy	19	73%	44	61%	1.73 (0.64-4.64)	
Living Situation						
Nuclear Family	8	31%	32	44%	0.56 (0.21-1.44)	0.25
Single Parent, Mother	10	38%	21	29%		
Single Parent, Father	0	0%	3	4%		
Foster Care	0	0%	1	1%		
Adoptive Family	5	19%	10	14%		
Grandparents	1	4%	0	0%		
Other Biological Relative	1	4%	2	3%		
Residential Facility	1	4%	3	4%		
Length of Stay						
Median	6		5			0.014
Mean (SD)	5.81	1.57	5.01	1.51		
Relevant Psychiatric History						
Self-Harm	22	85%	42	58%	3.93 (1.23-12.58)	0.017
Suicide Attempt	13	50%	33	46%	1.18 (0.48-2.90)	0.82
Trauma/Abuse	14	54%	26	36%	2.06 (0.83-5.12)	0.16
Family History of Mental Illness	18	69%	59	82%	0.50 (0.18-1.38)	0.26
History of Previous Hospitalizations	13	50%	24	33%	2.00 (0.80 -4.98)	0.16
Reason for Admission						
Suicidal Ideations	20	77%	47	65%		0.13
Suicide Attempt	3	12%	16	22%		
Homicidal Ideations	3	12%	2	3%		
Psychosis	0	0%	1	1%		
Mania	0	0%	0	0%		
Increased Aggression	0	0%	6	8%		

Significant p values are bolded

Table 2: Multivariate Regression for Significant Variables in Primary Analysis

	Odds Ratio	95% CI	P (z)
Length of Stay > 5 days	6.23	2.28 – 18.66	0.00058
Self-Harm	5.54	1.73 – 22.21	0.0075

Table 3: Summary of Data for Sub Analysis

	Readmitted		Not Readmitted		Odds Ratio (95% CI)	P-Value
Gender						
Male	16	32%	14	32%		
Female	34	68%	34	68%	0.88 (0.37 – 2.07)	0.83
Diagnosis						
Total Diagnoses, Median	2.00		2.00			0.00081
Depression	8	16%	10	21%	0.72 (0.26 – 2.02)	0.61
Anxiety	11	22%	13	27%	0.76 (0.30 – 1.91)	0.64
Psychosis	0	0%	1	2%		0.49
Personality Disorder	7	14%	2	4%	3.74 (0.74 – 19.03)	0.16
PTSD	11	22%	4	8%	3.10 (0.91 – 10.54)	0.09
Mood Disorder, Not Specified	34	68%	36	75%	0.71 (0.29 – 1.71)	0.51
Substance Abuse	3	6%	5	10%	0.55 (0.12 – 2.44)	0.48
Other	19	38%	4	8%	6.74 (2.09 – 21.77)	0.0007
ADHD	21	42%	5	10%	6.23 (2.11 – 18.39)	0.0005
Outpatient Treatment						
None	5	10%	10	21%	0.42 (0.13 – 1.34)	0.0078
Medication	1	2%	6	13%		
Therapy	4	8%	9	19%		
Medication and Therapy	40	80%	23	48%	4.35 (1.78 – 10.64)	
Living Situation						
Nuclear Family	15	30%	25	52%	0.39 (0.17 – 0.90)	0.039
Single Parent, Mother	18	36%	13	27%		
Single Parent, Father	1	2%	2	4%		
Foster Care	0	0%	1	2%		
Adoptive Family	10	20%	5	10%		
Grandparents	1	2%	0	0%		
Other Biological Relative	1	2%	2	4%		
Residential Facility	4	8%	0	0%		
Length of Stay						
Median	6		5			0.014
Mean (SD)	5.58	1.57	4.85	1.47		
Relevant Psychiatric History						
Self-Harm	40	80%	24	50%	4.00 (1.64 – 9.79)	0.0028
Suicide Attempt	22	44%	24	50%	0.79 (0.35 – 1.74)	0.69
Trauma/Abuse	29	58%	11	23%	4.65 (1.93 – 11.16)	0.0005
Family History of Mental Illness	38	76%	39	81%	0.73 (0.28 – 1.93)	0.63
History of Previous Hospitalizations	37	74%	0	0%		
Reason for Admission						
Suicidal Ideations	37	74%	30	63%		0.17
Suicide Attempt	6	12%	13	27%		
Homicidal Ideations	4	8%	1	2%		
Psychosis	0	0%	1	2%		
Mania	0	0%	0	0%		
Increased Aggression	3	6%	3	6%		

Table 4: Multivariate Regression for Significant Variables in Sub Analysis

	Odds Ratio	95% CI	P (z)
Trauma	4.33	1.64 – 12.33	0.0041
History of Self-Harm	4.48	1.58 – 14.25	0.0069
Length of Stay > 5 days	2.63	0.98 – 7.49	0.060
Combined Outpatient Therapy	2.76	1.01 – 7.83	0.0502

Table 5: Diagnoses classified as “Other” in Primary Analysis

Other Diagnoses						
	Readmitted		Not Readmitted		Odds Ratio	P-Value
	Count	Percentage	Count	Percentage		
Autism Spectrum Disorder	3	12%	6	8%	1.43 (0.33 – 6.21)	0.70
Bipolar Mood Disorder	4	15%	7	11%	1.45 (0.40 – 5.31)	0.73
Oppositional Defiant Disorder	1	4%	4	6%	0.68 (0.07 – 6.38)	1
Conduct Disorder	0	0%	1	1%		1
Eating Disorder	1	4%	0	0%		0.265
Reactive Attachment Disorder	0	0%	1	1%		1

Table 6: Diagnoses classified as “Other” in Sub Analysis

Other Diagnoses						
	Readmitted		Not Readmitted		Odds Ratio	P-Value
	Count	Percentage	Count	Percentage		
Autism Spectrum Disorder	8	16%	1	2%	8.95 (1.07 - 74.59)	0.031
Bipolar Mood Disorder	10	20%	2	4%	5.75 (1.19 - 27.81)	0.028
Oppositional Defiant Disorder	3	6%	2	4%	1.47 (0.23 – 9.20)	1
Conduct Disorder	1	2%	0	0%		1
Eating Disorder	1	2%	0	0%		1
Reactive Attachment Disorder	1	2%	0	0%		1

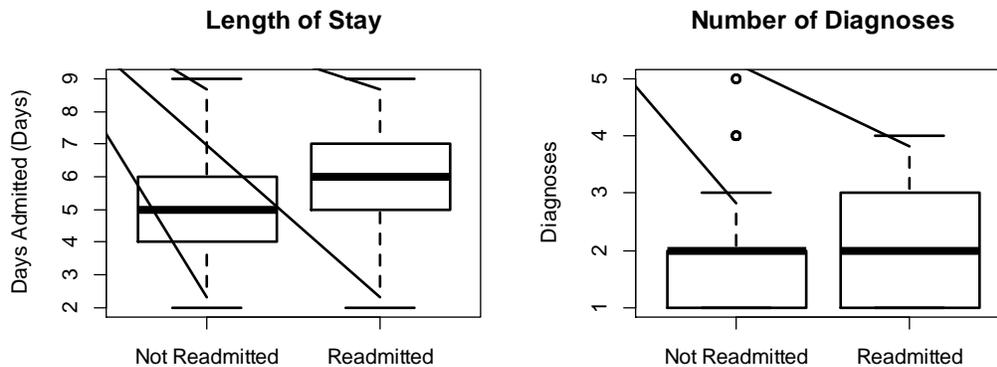


Figure 1: Distribution of length of stay and number of diagnoses for the primary analysis.

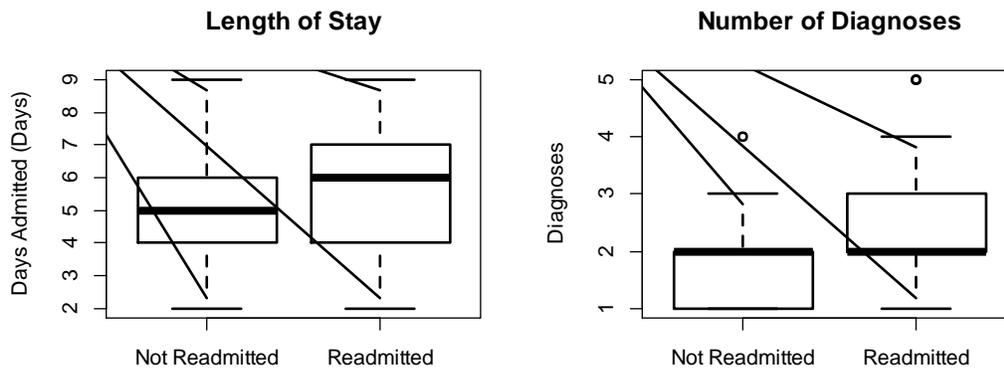


Figure 2: Distribution of length of stay and number of diagnoses for sub analysis.

Discussion

Significant Variables

The variables of length of stay and history of self-harm were found to be statistically significant risk factors for rehospitalization during the primary analysis. The variables of self-harm and a prior history of trauma and abuse were found to be statistically significant risk factors for readmission in the sub analysis. While the variables of length of stay and the presence of combined medication management and therapy services in the outpatient setting were found to be nearly significant risk factors for rehospitalization. These four variables need to be identified and taken into consideration when planning discharge treatment for adolescents, as these clients may be at an increased risk for repeat hospitalizations. Prolonged length of stay is most likely a risk factor for rehospitalization as clients with longer lengths of stay are most likely severe cases and will require numerous resources to maintain stability upon discharge from the hospital. If a client is hospitalized for more than 5 days, it may be reasonable for the discharge planner to take the precaution of discharging the client into a step down partial program, or intensive outpatient (IOP) program that the client will be involved in for several weeks after discharge. Discharging

an adolescent into a partial day program or IOP program will provide a structured environment for the client, where there will be a mental health professional present to assess for acute mental health symptoms and provide crisis management services if necessary. Engaging in self-harming behaviors was the only variable found to be a significant risk factor for recidivism in both analyses, with 85% of readmissions in the primary analysis having a history of engaging in self-harming behavior. It is noteworthy that having a history of suicide attempt was not found to be a significant risk factor for recidivism, as originally hypothesized, as one may assume the two may be related. A possible explanation for this result is that self-harming behavior is often a chronic condition that is not easily extinguished, and represents sustained depression, feelings of worthlessness, feelings of hopelessness, and poor self-esteem. Whereas a suicide attempt for adolescents, in some but not all cases, may represent an impulsive response to an in the moment trigger. It may be possible that the increased severity of a suicide attempt scares some clients straight, whereas the often less severe activity of cutting is more sustainable, and acts as a factor that may prolong a depressed mood. Based on the findings of this study, the charts of adolescents who have a history of self-harming behaviors should be flagged upon admission to an acute child and adolescent psychiatric hospital, in order to assess for proper outpatient services, and to discuss the need for increased monitoring for self-harming behavior with the client's family upon discharge. The charts of clients with a previous history of trauma and abuse should also be flagged upon admission, and assessed for the presence of proper outpatient services that treat the symptoms of trauma and abuse. Consideration should be given to focusing both inpatient and outpatient therapy services on the prior traumatic experience(s), even in situations where the client may state that the traumatic event is no longer an issue for the client. Clients with a background of trauma may come from unstable living environments, therefore it is

recommended that a case manager assess the client's current living situation and current support system. Previous studies have indicated that the presence of having outpatient services is indicative that an adolescent is at a greater risk for readmission to an acute psychiatric hospital, and this study supports these previous findings. Possible explanations for this phenomenon could be that adolescents with an extensive history of mental health issues will most likely already have outpatient services in place, and be consistently assessed for acute inpatient criteria, than their counterparts who do not attend outpatient services.

Non-Significant Variables

What may be even more interesting than the variables that were deemed statistically significant risk factors for recidivism, are the variables that were not considered significant risk factors for repeat hospitalizations. The variables of history of a suicide attempt, gender, diagnoses, history of family mental illness, reason for admission, living situation, and history of previous hospitalizations were all deemed non-significant risk factors for predicting repeat hospitalization among adolescents. Even though twice as many females were admitted to the hospital (68) compared to males (30), the hypothesis that female gender would be a predictor of readmission was found to be non-significant, as readmission rates between females and males is proportionally comparable. This does generate the question for future research of whether adolescent females are more likely to require acute hospitalization for mental health issues than adolescent males. Certain diagnoses, such as depression and personality disorders, were not indicative of an increased rate of recidivism as originally hypothesized. This result may indicate that situational circumstances may play a bigger role in readmission for adolescents, than specific mental health issues, as no diagnosis had a higher rate of recidivism than any other diagnosis when conducting multivariate analysis during the primary analysis.

While 77 of the 98 observed adolescents did have a family mental health history, nearly an equal number of adolescents with a family mental health history were readmitted vs. not being readmitted when conducting the sub analysis. This may indicate that while having a family history of mental illness may increase the chance that an individual develops a mental illness, it does not indicate that an individual will require multiple hospitalizations at a mental health hospital. Eighty six of the 98 hospitalized adolescents were hospitalized for having suicidal ideations in some capacity, either through an actual suicide attempt, or just suicidal thoughts. It was difficult to determine if mania, homicidal ideations, increased aggression, and psychosis play a role in recidivism with the adolescent populations. It is recommended that a larger sample size with these admitting criteria be used in future studies to determine what level of significance certain admitting criteria play in recidivism among adolescents admitted to a psychiatric facility.

The results of the study demonstrate that having a suicide attempt or suicidal thoughts prior to admission does not appear to predict if a client is at risk for recidivism. Of the 19 clients in the sub analysis who were originally admitted to the hospital for a suicide attempt, 13 were not readmitted to the hospital, while 6 adolescents had to be admitted to the hospital again within 12 months. Out of the 67 clients in the sub analysis who were admitted to the hospital for suicidal ideations, 37 clients had to be readmitted to the hospital within 12 months, compared to 30 clients who were not rehospitalized. While this data was not statistically significant, it is interesting and may reflect that having a history of a suicide attempt does not necessarily make an individual a high risk for readmission, whereas having a history of self-harming behavior or suicidal thoughts may place an adolescent at risk for readmission. Perhaps the less severe the behavior, the more likely it is to persist over the long term. A limitation to this theory is that the variables of self-harming and suicide attempt in this study were not independent of one another,

and there were individuals with a history of both behaviors present in the study. The primary analysis did not indicate that a prior inpatient hospitalization history was a significant risk factor for rehospitalization, as predicted in the hypothesis. This may indicate that clients who do have issues with recidivism have the same opportunity of stabilizing and maintaining safety after each admission as adolescents that never return to the hospital, which is a positive and reassuring thought.

Limitations and Future Directions for Research

One of the limitations of the study includes the small sample size. It may be more beneficial to follow all of the adolescents admitted to an acute child and adolescent hospital during a season of the year, and then follow this sample for 2 years, in order to assess for risk factors for recidivism. Another limitation of the study includes that data was only collected from one hospital. It is possible that some of the clients may have been readmitted to another psychiatric hospital in the area at some point in time during the 12 month window of observation. Future studies on this subject may need to analyze group data from every child and adolescent psychiatric hospital in a certain region or county, in order to collect a more accurate representation of the risk factors that lead to recidivism. Thirdly, another limitation of the study is that the hospital used for this study is located in the wealthiest county in its' state, and may have a disproportionate amount of upper and middle class clientele than other acute psychiatric child and adolescent hospitals. Lastly, a limitation of the study is that the general reason why a client was admitted to the hospital was recorded, but the circumstances leading up to admission were not accounted for. While investigating the charts of each client it seemed as if a verbal or physical altercation with a family member, or break up with a significant other was often a precipitating factor to admission. It may be beneficial to conduct a study to obtain information

about what events are most likely to precede an admission to an acute child and adolescent psychiatric hospital, in order to better prepare families and outpatient providers with ways of preventing or safely managing certain circumstances. This study indicates that self-harming behavior is a risk factor for repeat acute psychiatric hospitalizations among adolescent populations. It will be important for future studies to focus on this topic, and provide answers for what treatments best reduce self-harming behaviors in adolescents, as well as provide etiologies to this destructive behavior.

Dissemination

The findings of this study will be reported utilizing multiple avenues. The findings of this study will be disseminated locally by means of a PowerPoint presentation to the clinicians, nurses, therapists, social workers, and administrative staff, in the hospital where the study was undertaken. This article will be submitted for possible publication to the *Journal of Child and Adolescent Psychiatric and Mental Health Nursing*, as well as the *International Journal of Mental Health Nursing* in order to find a widespread audience. The Kansas chapter of the American Psychiatric Nurses Association will be contacted in order to identify a conference where a poster presentation can take place to disseminate the results of the study to mental health nurses located in the Midwest.

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