Inpatient Psychiatric Care Outcomes for Adolescents: A Test of Clinical and Psychosocial Moderators

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Abstract

Financial pressures have led to a reduced length of stay (LOS) in inpatient psychiatric facilities for adolescents, yet research on the outcomes of short-term programs remains scant. The present study evaluated the outcomes of an adolescent inpatient program by: (1) probing depression, anxiety, and suicidal ideation at admission and discharge and (2) testing whether clinical or psychosocial factors moderate treatment response. Participants included adolescents ($n = 777$) aged 13–19 years admitted to an inpatient treatment program for acute psychiatric concerns. Clinical interviews were administered to probe mental disorders and past suicidal thoughts and behaviors (STBs), and self-report measures assessed symptom severity, child abuse, and peer victimization (i.e., bullying). Results showed a significant decrease in depression, anxiety, and suicidal ideation from admission to discharge. Comorbidity, past month NSSI, and lifetime suicide attempts emerged as moderators of treatment response, and peer victimization predicted symptom severity at discharge. Although findings suggest an overall improvement, participants with more severe clinical presentations (e.g., comorbidity, past month NSSI, lifetime suicide attempts, and more severe bullying) reported greater symptom severity at admission and discharge, suggesting that these patients may benefit from longer inpatient stays to achieve further symptom reduction. Although this may incur greater costs in the short-term, it also may prevent unintended economic and psychosocial consequences in the long-term.

Introduction

Historically, inpatient psychiatric facilities for children and adolescents focused on comprehensive diagnostic evaluation and treatment of youth with severe emotional and behavioral disturbances, and long hospital stays ranging from several weeks to months were common. Recent financial and political pressures, however, have led to decreased utilization

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of inpatient services and a reduced length of stay (LOS; Case et al., 2007; Tulloch, Fearon, & David, 2011). These pressures include a shift towards managed care with an increased emphasis on cost effectiveness and demands from mental health advocates for treatment in the least restrictive setting possible (Thayaril et al., 2012). Thus, between 1990 and 2000, LOS decreased by ~63% with a median LOS of 4.5 days in inpatient facilities (Case et al., 2007). Consequently, the goals of inpatient psychiatric treatment have shifted from complete symptom resolution to rapid stabilization and transition to community-based care.

These recent changes in mental health care have raised the question about whether short-term inpatient psychiatric programs are effective. A number of reviews suggest that inpatient psychiatric treatment generally results in positive outcomes, including improvements in psychiatric symptoms, behavior, and overall functioning (Bettmann & Jasperson, 2009; Blanz & Schmidt, 2000; Hayes et al., 2018). In the most recent review, Hayes and colleagues (2018) identified 16 cross-national studies evaluating mental health outcomes for adolescents receiving inpatient care. Generally, studies showed improvement in a number of key domains, including psychiatric symptoms, psychosocial functioning (e.g., peer relationships, school performance), and behavioral problems (e.g., aggression, self-injury, substance use). However, the review compiled studies from multiple countries and LOS varied considerably, ranging from 4 to 335 days. To date, limited research has been conducted in the United States, and thus, more research is needed to test clinical outcomes following inpatient programs with abbreviated patient stays.

Critically, there are a number of factors that may affect a patient's short-term treatment trajectory. In developing a patient-centered approach, it will be essential to identify which clinical and psychosocial factors influence whether patients achieve appropriate symptom stabilization and avoid negative outcomes in the context of a reduced LOS. For example, researchers have investigated the influence of mental disorder diagnosis on effectiveness of inpatient care. Whereas some studies show no differences according to diagnostic category (Green et al., 2007; Herdzik, 2008; Mathai & Bourne, 2009), other studies have shown that individuals with internalizing disorders (e.g., depression or anxiety) show more improvement in symptoms and overall functioning compared to individuals with externalizing disorders (e.g., ADHD or conduct disorders) (Connor et al., 2002; Hooper et al., 2000; Lyons et al., 2001; Mayes et al., 2001; Wise, Cuffe, & Fischer, 2000). Additionally, the presence of comorbid psychiatric conditions may worsen clinical course relative to an isolated diagnosis (Rohde et al., 2001; Storch et al., 2008), and Hooper et al. (2000) showed that following residential care adolescents with fewer psychiatric diagnoses were more likely to attend and graduate from school, abstain from criminal activity, and avoid psychiatric rehospitalization.

Other researchers have investigated the influence of non-suicidal self-injury (NSSI) and suicidal thoughts and behaviors (STBs) on treatment outcomes. In outpatient samples, individuals who exhibit NSSI are at greater risk for subsequent suicide attempts (Lofthouse & Yager-Schweller, 2009; Wilkinson et al., 2011). Further, in inpatient settings, more frequent NSSI prior to entering treatment is associated with poor treatment outcomes (Prinstein et al., 2008) and predicts rehospitalization within 6 months of discharge (van Alphen et al., 2017). Lifetime suicide attempt history also impacts inpatient treatment

response. For example, suicide attempts in adolescence have been associated with a high prevalence of subsequent psychiatric diagnoses, psychiatric treatment, and later suicide attempts (Groholt & Ekeberg, 2009). However, the impact of STBs in response to inpatient treatment have been mixed. Although one study found that youth with recent suicidal behavior were at higher risk for later readmission to a psychiatric hospital (Fontanella, 2008), several studies have demonstrated no association of STBs with outcome of inpatient psychiatric treatment (Gabel & Shindledecker, 1990; Gabel & Shindledecker, 1992).

Psychosocial factors also may offer key insights. History of childhood abuse has been linked to increased lifetime risk of subsequent psychiatric disorders and suicidal behaviors (Chen et al., 2010; Macmillan et al., 2001), and rates of abuse among adolescent inpatients are high (Havens et al., 2012). However, findings on the impact of childhood abuse in response to inpatient treatment are mixed. Although the majority of studies have demonstrated poor outcomes associated with childhood abuse history (Connor et al., 2002; Embry et al., 2000; Gabel & Shindledecker, 1990), Hooper et al. (2000) found no effect of abuse history, and Herdzik (2008) found greater improvement among individuals with a history of abuse. Peer victimization also is associated with a range of psychological problems, including depression and anxiety (Hawker & Boulton, 2000; Reijntjes et al., 2009). Despite its relevance to mental health, one prior study did not find a significant effect of peer victimization on response to inpatient treatment (Stage, 1999). However, the role of psychosocial factors warrants additional research.

Goals of the Current Study

Research on adolescent inpatient psychiatric treatment outcomes following reduced LOS is scant, and findings on the impact of individual clinical and psychosocial factors on treatment response have been mixed. Evaluating inpatient treatment outcomes and the influence of clinical and psychosocial factors is important to ensure appropriate utilization of mental health resources. Thus, the current study tested clinical outcomes within a short-term, insurance-based inpatient program for adolescents aged 13 to 19 years. There were two primary goals: (a) test whether inpatient treatment led to reductions in depression, anxiety, and suicidal ideation and (b) determine whether specific clinical (e.g. comorbidity, psychiatric diagnosis, self-injurious thoughts and behaviors) and psychosocial (child abuse, peer victimization) factors moderated the response to treatment.

Method

Participants

Participants included 777 adolescents (550 females, 214 males, 12 transgender, 1 unreported) aged 13–19 years (M = 15.59, SD = 1.41) admitted to an inpatient treatment program between July 9, 2012 and April 12, 2017. Their racial and ethnic distribution included 81.2% White, 10.2% multicultural (i.e., endorsed more than 1 race), 5.7% Asian, 2.1% African American, 0.3% Native Hawaiian or Pacific Islander, and 0.6% American Indian/Alaska native. The majority of participants' guardians received at least some college education or an advanced degree: 85.1% of mothers (n = 619) and 81.8% of fathers (n =

567). The majority of the sample reported a family income of more than $50,000 per year (76.5%, $n = 351$).

Procedures

The study was part of a broader quality assurance project, which was overseen and approved by the Partners Institutional Review Board. Adolescents aged 13 to 17 years provided written assent, and adolescents 18 years and older and legal guardians consented. Patients were admitted to an insurance-based inpatient treatment program for acute clinical concerns, including severe symptoms, failure to thrive in outpatient treatment, and safety concerns (e.g., suicidal behaviors or escalating self-injury). They received a combination of individual and group psychotherapy (e.g., cognitive behavioral therapy, dialectical behavior therapy), family therapy, pharmacotherapy, and case management aimed toward acute stabilization and rapid symptom reduction. LOS ranged from 0 to 81 days (Median = 13.0, SD = 6.26). Patients received treatment from 9:00 am to 4:00 pm Monday through Friday, and during evenings and weekends, structured activities were centered on patient-oriented goals (e.g., skills practice).

Assessments were integrated into routine clinical care, and consequently, nearly all participants admitted completed diagnostic interviews and self-report measures. At admission, clinical interviews were administered to assess Axis I diagnoses and self-injurious thoughts and behaviors. In addition, participants completed self-report questionnaires assessing psychiatric symptom severity (including depression, anxiety, and suicidal ideation), childhood abuse, and peer victimization (i.e., bullying). Self-report assessments of depression, anxiety, and suicidal ideation were repeated at discharge.

Clinical Interviews

The Mini International Neuropsychiatric Interview for Children and Adolescents (MINI-KID; Sheehan et al., 2010) is a structured diagnostic interview that assesses current and past diagnoses for children and adolescents using DSM-IV criteria. In the present study, only current diagnoses were considered. All interviews were conducted by bachelor's level research assistants or graduate students after they received at least 25 hours of training. The MINI-KID has shown validity in diagnosing psychopathology in youth (Sheehan et al., 2010). For the current study, depressive disorders were the most common diagnosis, followed by anxiety disorders and ADHD. Participants were divided into two groups based on number of current psychiatric diagnoses: individuals meeting criteria for more than one diagnosis on admission were designated as the "comorbidity" group and individuals meeting criteria for only one diagnosis on admission were designated as the "no comorbidity" group. Previous studies have suggested that individuals with an externalizing disorder respond differentially to inpatient treatment relative to those presenting without an externalizing disorder (Connor et al., 2002; Hooper et al., 2000; Lyons et al., 2001; Mayes et al., 2001; Wise, Cuffe, & Fischer, 2000). Thus, psychiatric diagnosis was collapsed into two broad categories: one category included patients with internalizing disorders only (all mood, anxiety, and eating disorders) and the second category included patients with externalizing disorders only (ADHD, CD, ODD, and substance use disorders) or externalizing disorders in addition to other disorders (see Tharayil et al., 2012).[1]

The Self-Injurious Thoughts and Behaviors Interview (SITBI; Nock et al., 2007) was administered on admission. The SITBI is a brief structured interview developed to assess the presence, frequency, and characteristics of a wide range of self-injurious thoughts and behaviors, including NSSI, suicidal ideation, suicide plans, suicide gestures, and suicide attempts. It has shown strong interrater reliability, test-retest reliability, and validity (Nock et al., 2007). The SITBI was used to group individuals according to history of recent NSSI (defined as at least one instance of self-injury in the past month) and according to history of lifetime suicide attempts (i.e. at least one lifetime attempt versus no attempts).

Self-Report Instruments

The Childhood Trauma Questionnaire-Short Form (CTQ-SF; Bernstein et al., 2003) is a 15-item questionnaire that assesses the presence and severity of childhood maltreatment and abuse. The current study used only the physical abuse and sexual abuse subscales. Each subscale consists of 5 items, and item scores range from 1 (*never true*) to 5 (*very often true*). Scores were dichotomized to indicate the presence versus absence of physical (scores ≥ 8) and sexual (scores ≥ 6) abuse (Bernstein & Fink, 1998). The CTQ had good internal consistency ($\alpha = 0.881$). Individuals with a history of physical or sexual abuse were classified as the abuse group, and individuals with no history of physical or sexual abuse were classified as the no abuse group.

The Revised Peer Experiences Questionnaire (RPEQ; Prinstein, Boergers, & Vernberg, 2001) was used to assess peer victimization (i.e., bullying). This study utilized a version that employed three subscales: overt, relational, and reputational victimization. Each subscale consisted of 3-items, and each item ranges from 1 (*never*) to 5 (*a few times a week*). Mean peer victimization score across the total sample was 6.22 (SD = 2.58). The internal consistency of the RPEQ was strong ($\alpha = 0.890$).

The Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) is a 20-item self-report questionnaire that measures depressive symptom severity over the past week. Each item is scored from 0 (*rarely or none of the time*) to 3 (*most or all of the time*), and responses are summed for a total score. Scores range from 0 to 60, and higher scores indicate greater depressive symptoms with a score of 16 or greater reflecting a cutoff for major depression. The CES-D had excellent internal consistency at baseline ($\alpha = 0.938$) and discharge ($\alpha = 0.939$).

The Multidimensional Anxiety Scale for Children (MASC; March et al., 1997) is a 39-item self-report questionnaire that assesses anxiety in children and adolescents. Each item is scored on a 4-point Likert scale ranging from 0 (*never true about me*) to 3 (*often true about me*). Total scores range from 0 to 60, and higher scores indicate greater anxiety symptoms. The internal consistency of the MASC was excellent at baseline ($\alpha = 0.919$) and discharge ($\alpha = 0.919$).

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[1]When participants were divided into three groups (internalizing disorders only, externalizing disorders only, or internalizing and externalizing disorders), the externalizing disorders only group had a small sample size ($n = 12$). As a result, a decision was made to collapse diagnosis into two groups (internalizing disorder only vs. any externalizing disorder).

The Beck's Scale for Suicide Ideation (BSS; Beck, Kovacs, & Weissman, 1979) was used to assess current intensity of suicide ideation (specific attitudes, behaviors, and plans to commit suicide). The BSS is a 19-item self-report questionnaire to help identify individuals at risk for suicide. Each item is scored from 0 (*least severe*) to 2 (*most severe*), with total scores ranging from 0 to 38. The BSS had good internal consistency at baseline ($\alpha = 0.875$) and discharge ($\alpha = 0.878$).

Data Analytic Plan

All analyses were completed using IBM SPSS Statistics version 25.0 (Armonk, NY). The outcomes of interest were depression symptoms, anxiety symptoms, and suicidal ideation. Paired samples *t*-tests were performed to compare pre-treatment and post-treatment symptoms. Univariate associations were assessed to examine the effect of individual participant characteristics on treatment response. Two-factor repeated measures analyses of variance (ANOVAs) were used to assess the effects of categorical baseline variables on continuous outcome variables. LOS was used as a covariate in all analyses. Each model included one within-subjects factor (*Time*) and one between-subjects factor (*Diagnostic Category, Comorbidity*, *Past Month NSSI, Lifetime Suicide Attempt*, or *Abuse History*). Multiple linear regression was used to assess the association between continuous baseline (peer victimization score) and outcome variables. Block 1 included baseline symptoms and LOS as independent variables, and peer victimization was added in Block 2. To account for multiple comparisons, a Bonferroni correction was applied, and thus, we used a *p*-value threshold of 0.003 (*p*-value = .05/18).

Results

Treatment Outcomes

Clinical and psychosocial characteristics of participants are presented in Table 1. The mean scores on depression, anxiety, and suicidal ideation symptoms at admission and discharge are summarized in Table 2.

Diagnosis

Two-way repeated measures ANOVAs with *Group* (Internalizing Disorder Only, Externalizing Disorder) and *Time* (Baseline, Discharge) as factors and symptoms of depression, anxiety, or suicidal ideation as the dependent variable were analyzed. No between-groups differences for LOS emerged ($t(659) = -0.818$, $p = 0.414$).

Depression Symptoms—The *Group × Time* interaction was not significant, $F(1,478) = 0.929$, $p = 0.336$, $\eta_p^2 = 0.002$; however, there was a significant main effect of *Time*, $F(1,478) = 41.034$, $p < 0.001$, $\eta_p^2 = 0.079$. Depression symptoms were lower at discharge compared to admission. The main effect of *Group* was not significant, $F(1,478) = 0.878$, $p = 0.349$, $\eta_p^2 = 0.002$.

Anxiety Symptoms—The *Group × Time* interaction was not significant, $F(1,452) = 1.863$, $p = 0.173$, $\eta_p^2 = 0.004$. Neither the main effect of *Time*, $F(1,452) = 6.563$, $p = 0.011$,

$\eta_p^2 = 0.014$, nor the main effect of *Group*, F(1,452) = 0.059, $p = 0.808$, $\eta_p^2 < 0.001$, were significant.

Suicidal Ideation—The *Group × Time* interaction was not significant, F(1,529) = 1.006, $p = 0.316$, $\eta_p^2 = 0.002$, but there was a significant main effect of *Time*, F(1,529) = 14.388, $p < 0.001$, $\eta_p^2 = 0.026$. Suicidal ideation was lower at discharge compared to admission. The main effect of *Group* was not significant, F(1,529) = 0.544, $p = 0.461$, $\eta_p^2 = 0.001$.

Comorbidity

ANOVAs with *Group* (Comorbidity, No Comorbidity) and *Time* (Baseline, Discharge) as factors were conducted, and there were no between-groups differences of LOS (t(713) = 0.399, $p = 0.690$).

Depression Symptoms—The *Group × Time* interaction was not a significant, F(1,515) = 4.522, $p = 0.034$, $\eta_p^2 = 0.009$, but a main effect for *Time* emerged, F (1,515) = 45.668, $p < 0.001$, $\eta_p^2 = 0.081$, as depression symptoms were lower at discharge compared to admission. There also was a main effect of *Group*, F(1,515) = 14.603, $p < 0.001$, $\eta_p^2 = 0.028$; between-groups comparisons showed that comorbid group had higher levels of depression at both baseline and discharge ($ps < 0.014$). Within groups comparisons revealed that both groups showed improvement in depression symptoms over the course of hospitalization ($ps < 0.001$).

Anxiety Symptoms

The *Group × Time* interaction was not significant, F(1,489) = 0.749, $p = 0.387$, $\eta_p^2 = 0.002$. The main effect of *Time* was not significant, F(1,489) = 2.648, $p = 0.104$, $\eta_p^2 = 0.005$; however, there was a significant main effect of *Group*, F(1,489) = 33.234, $p < 0.001$, $\eta_p^2 = 0.064$, such that the comorbid group showed more severe anxiety symptoms compared to the non-comorbid group ($p < 0.001$).

Suicidal Ideation—The *Group × Time* interaction was not significant, F(1,572) = 2.735, $p = 0.099$, $\eta_p^2 = 0.005$. There was, however, a main effect of *Time*, F(1,572) = 12.956, $p < 0.001$, $\eta_p^2 = 0.022$. Suicidal ideation was lower at discharge compared to admission. The main effect of *Group* was not significant, F(1,572) = 3.663, $p = 0.056$, $\eta_p^2 = 0.006$.

NSSI

ANOVAs with *Group* (Past Month NSSI, No Past Month NSSI) and *Time* (Baseline, Discharge) were analyzed with depression, anxiety, or suicidal ideation as the dependent variable. There were no between-groups differences when comparing LOS (t(713) = −1.887, $p = 0.060$).

Depression Symptoms—The *Group × Time* interaction was not significant, F(1,515) = 3.912, $p = 0.048$, $\eta_p^2 = 0.008$, but a significant main effect for *Time* emerged, F(1,515) = 55.457, $p < 0.001$, $\eta_p^2 = 0.097$, as depression symptoms were lower at discharge compared to admission. There also was a main effect of *Group*, F(1,515) = 50.303, $p < 0.001$, $\eta_p^2 = 0.089$; between-groups comparisons showed that individuals with a history of NSSI in the

past month had higher levels of depression at both baseline and discharge ($ps < 0.001$). Within group comparisons revealed that individuals in both groups showed a decrease in depression symptoms from admission to discharge ($ps < 0.001$).

Anxiety Symptoms—The *Group × Time* interaction was not significant, $F(1,489) = 0.093$, $p = 0.760$, $\eta_p^2 < 0.001$. The main effect of *Time* was not significant, $F(1,489) = 3.465$, $p = 0.063$, $\eta_p^2 = 0.007$. However, there was a significant main effect of *Group*, $F(1,489) = 45.404$, $p < 0.001$, $\eta_p^2 = 0.085$; particiapnts with a history of recent NSSI showed more severe anxiety symptoms compared to those without a history of recent NSSI ($p < 0.001$).

Suicidal Ideation—The *Group × Time* interaction was significant, $F(1,572) = 28.465$, $p < 0.001$, $\eta_p^2 = 0.047$, and a main effect for *Time* emerged, $F(1,572) = 20.339$, $p < 0.001$, $\eta_p^2 = 0.034$. Suicidal ideation was lower at discharge relative to admission. There also was a main effect of *Group*, $F(1,572) = 53.019$, $p < 0.001$, $\eta_p^2 = 0.085$. Between-groups comparisons showed that individuals with a past month history of NSSI had higher levels of ideation at baseline and discharge ($ps < 0.001$). Within group comparisons revealed that individuals in both groups showed a significant decrease in suicidal ideation over the course of treatment ($ps < 0.001$).

Suicide Attempts

Two-way repeated measures ANOVAs with *Group* (Lifetime Suicide Attempt, No Lifetime Suicide Attempt) and *Time* (Baseline, Discharge) as factors were conducted, and no between-groups differences in LOS emerged ($t(688) = -0.878$, $p = 0.380$).

Depression Symptoms—The *Group × Time* interaction was not significant, $F(1,514) = 0.752$, $p = 0.386$, $\eta_p^2 = 0.001$; however, there was a significant main effect of *Time*, $F(1,514) = 54.517$, $p < 0.001$, $\eta_p^2 = 0.096$. Depression symptoms were lower at discharge compared to admission. The main effect of *Group* was not significant, $F(1,514) = 3.619$, $p = 0.058$, $\eta_p^2 = 0.007$.

Anxiety Symptoms—The *Group × Time* interaction was not significant, $F(1,487) = 0.743$, $p = 0.389$, $\eta_p^2 = 0.002$. There was no significant main effect of *Time*, $F(1,487) = 3.923$, $p = 0.048$, $\eta_p^2 = 0.008$. There also was no main effect of *Group*, $F(1,487) = 6.306$, $p = 0.012$, $\eta_p^2 = 0.013$.

Suicidal Ideation—The *Group × Time* interaction was significant, $F(1,570) = 41.042$, $p < 0.001$, $\eta_p^2 = 0.067$, and a main effect for *Time* emerged, $F(1,570) = 24.975$, $p < 0.001$, $\eta_p^2 = 0.042$. Suicidal ideation was lower at discharge relative to admission. There also was a main effect of *Group*, $F(1,570) = 47.154$, $p < 0.001$, $\eta_p^2 = 0.076$. Between-groups comparisons showed that individuals with a lifetime suicide attempt history had higher levels of ideation at baseline and discharge ($ps < 0.001$). Within group comparisons revealed that individuals in both groups showed improvement in symptoms of suicidal ideation from admission to discharge ($ps < 0.001$).

Child Abuse

A two-way repeated measures ANOVA with *Group* (Abuse, No Abuse) and *Time* (Baseline, Discharge) as factors were analyzed, and notably, there were no between-groups differences of LOS ($t(695) = -0.829$, $p = 0.407$).

Depression Symptoms—The *Group* × *Time* interaction was not significant, F(1,502) = 0.469, $p = 0.494$, $\eta_p^2 = 0.001$; however, there was a significant main effect of *Time*, F(1,502) = 55.103, $p < 0.001$, $\eta_p^2 = 0.099$. Depression symptoms were lower at discharge compared to admission. There also was a main effect of *Group*, F(1,502) = 8.827, $p = 0.003$, $\eta_p^2 = 0.017$, as individuals with a history of childhood abuse showed more severe depression symptoms compared to those without a history of childhood abuse ($p < 0.001$).

Anxiety Symptoms—The *Group* × *Time* interaction, F(1,480) = 1.685, $p = 0.195$, $\eta_p^2 = 0.003$ and main effect of *Time*, F(1,480) = 4.467, $p = 0.035$, $\eta_p^2 = 0.009$, were not significant. A main effect of *Group*, however, emerged, F(1,480) = 13.016, $p < 0.001$, $\eta_p^2 = 0.026$. The abuse group showed more severe anxiety symptoms compared to the no abuse group ($p < 0.001$).

Suicidal Ideation—The *Group* × *Time* interaction was not significant, F(1,559) = 3.741, $p = 0.054$, $\eta_p^2 = 0.007$; however, there was a significant main effect of *Time*, F(1,559) = 21.405, $p < 0.001$, $\eta_p^2 = 0.037$. Suicidal ideation was lower at discharge compared to admission. The main effect of *Group* was significant, F(1,559) = 13.534, $p < 0.001$, $\eta_p^2 = 0.024$. Individuals with a history of abuse showed more severe suicidal ideation compared to those without a history of abuse ($p < 0.001$).

Peer Victimization

Three linear regression models tested whether peer victimization scores predicted discharge symptoms while controlling for baseline symptoms and LOS. Results indicated that greater peer victimization predicted more severe depressive symptoms at discharge, $b = 0.729$, $p < 0.001$, with inclusion of peer victimization showing a modest improvement in model fit (F(1,429) = 13.146, $p < 0.001$, $R^2 = 0.020$). However, peer victimization was not a predictor of discharge anxiety ($b = 0.400$, $p = 0.068$). Additionally, greater peer victimization predicted more severe suicidal ideation at discharge, $b = 0.230$, $p = 0.024$, but the inclusion of peer victimization, although significant, did not markedly improve model fit (F(1,443) = 5.099, $p = 0.024$, $R^2 = 0.007$) and did not survive the Bonferroni correction.

Discussion

Recent reductions in LOS for inpatient psychiatric facilities raise the question of whether these short-term programs result in symptom attenuation. The present study tested short-term inpatient outcomes to determine whether: (1) inpatient treatment leads to reductions in depression, anxiety, and suicidal ideation and (2) specific clinical or psychosocial factors moderate treatment response.

Overall, inpatient treatment resulted in a reduction in symptoms of depression, anxiety, and suicidal ideation from admission to discharge, which is consistent with prior research

(Bettmann & Jasperson, 2009; Blanz & Schmidt, 2000; Hayes et al., 2018). When investigating the role of individual clinical and psychosocial factors, past month NSSI and lifetime suicide attempt history emerged as moderators, and peer victimization predicted treatment response (albeit with a small effect size). Overall, patients showed improvement following inpatient care, but individuals with recent NSSI, a lifetime history of suicide attempts, and peer victimization exhibited more severe symptomatology at both admission and discharge, and, many of these patients reported severe symptoms post-treatment.

Although it is encouraging that the majority of patients showed progress, the fact that many patients are discharged with symptoms remaining at clinically significant levels is concerning. High levels of residual symptoms may make it difficult for adolescents to function outside of the hospital. Depressive symptoms have been linked to poor school performance, difficulties in family and peer relationships, increased health risk behaviors, legal problems, and suicide (Birmaher & Brent, 2007; Fröjd, et el., 2008; Hawton et al., 2013; Humensky et al., 2010; Jaycox et al., 2009; Katon et al., 2010). Residual symptoms also may place patients at risk for relapse and subsequent rehospitalization. In outpatient samples, residual symptoms are among the strongest predictors of depression relapse (Bockting, Koeter, & Schene, 2010; Emslie et al., 2008; Kennard et al., 2009; Paykel, 2008), and rehospitalizations carry a substantial economic burden (Bardach et al., 2014) and can adversely impact the social and psychological well-being of adolescents. With repeated hospitalization, patients may experience disruptions in their social lives, making it difficult to form support networks in the community (Noyola et al., 2014). In addition, as psychiatric units are often highly restrictive environments, the experience may lead to a sense of disempowerment and loss of autonomy (Chung et al., 2008).

Although most adolescent inpatient programs use evidenced-based clinical protocols to ensure the safety of patients after discharge (and during treatment), some researchers have posited that patients may benefit from increased LOS to achieve further symptom reduction (Appleby et al., 1993; Figueroa, Harman, & Engberg, 2004; Glick, Sharfstein, & Schwartz; Lien, 2000; Noyola et al., 2014; Wickizer, Lessler, & Boyd-Wickizer, 1999). Under the current financial pressure and structure, however, goals of inpatient care have shifted from complete symptom resolution to safety and crisis stabilization. Although discharging patients earlier may reduce costs in the short-term, these abbreviated stays may have negative repercussions that incur greater costs in the long-term. Reduced time in inpatient treatment makes it difficult to form supportive connections on the unit, observe meaningful changes with medication, fully consider and address psychosocial issues that perpetuate illness, and formulate careful discharge plans to ensure continued progress (Glick, Sharfstein, & Schwartz, 2011). As a result, many patients are discharged with residual symptoms and formidable clinical barriers (e.g., psychosocial issues that have not been addressed or inadequate outpatient treatment plans) that may diminish opportunities for sustained recovery. Several researchers have linked reduced LOS to increased rates of rehospitalization, providing support for the idea that abbreviated stays may be associated with negative consequences (Appleby et al., 1993; Figueroa, Harman, & Engberg, 2004; Lien, 2000; Wickizer, Lessler, & Boyd-Wickizer, 1999).

In the current study, LOS was ~13 days with relatively little variation regardless of clinical or psychosocial history. However, patients with recent NSSI, a lifetime history of suicide attempts, and peer victimization were admitted with more severe symptoms and remained more ill at the time of discharge. This is consistent with prior research suggesting that baseline symptoms are among the strongest predictors of outcome from inpatient treatment. King et al. (1997) followed 89 adolescents after psychiatric hospitalization and found that depressive symptoms, including suicidal thoughts, at the time of admission were strongly related to depression severity, STBs, and rehospitalization 6-months post-discharge. Thus, rather than following a standard regimen for each patient, these findings suggest that patients with a more severe clinical presentation at the outset of treatment may require a specialized approach to achieve further symptom reduction. As individuals with a recent NSSI, lifetime suicide attempts, and greater peer victimization tend to be more severe, it may be that these individuals would benefit from different therapies or adjunctive treatments, which fully consider their unique clinical and psychosocial background. Although this approach will likely result in extended stays for some patients, increased time and attention in inpatient care may be necessary to reduce symptoms to levels that allow for sustained recovery in the community.

Limitations and Future Directions

Several limitations warrant additional attention. First, as data were collected in a naturalistic setting (i.e., inpatient program), we did not include a control group for comparison and instead relied on a single-sample pre- to post-test design. As a result, we cannot disambiguate whether symptom change reflects the passage of time versus active treatment ingredients or test the effectiveness of this program. Second, we focused only on symptoms at admission and discharge. Future research with longer follow-up periods will be useful to clarify whether improvements observed at discharge from inpatient treatment persist. Moreover, discharging to home versus other clinical facilities may have important consequences for managing symptoms. Unfortunately, the present study did not collect this information, but future research focused on post-discharge symptom trajectories would benefit from addressing this issue. Third, we did not examine the influence of specific therapeutic elements on treatment outcome (e.g. individual therapy, group therapy, family therapy, pharmacotherapy). Future research should assess whether any particular components of therapy are most critical to symptom improvement. Fourth, the present study focused on patient-reported symptoms. Future research should obtain clinician (e.g., clinical interviews, behavioral observation) and parent (e.g., parent-report of child symptoms) assessments of symptoms to offer additional perspectives on clinical progress. Moreover, future research would benefit from accounting for other key variables when testing clinical outcomes, including number of prior inpatient psychiatric admissions, patient payer status, recent psychosocial stressors, family environment, and voluntary or involuntary status of admission. Last, results indicated that, in general, patients' symptoms improved over time. A potential confound, however, is that patients need to show improvement or symptom attenuation prior to discharge, which necessarily impacts our interpretation of clinical improvement. For example, patients are discharged at the point of stabilization, but many may experience symptom recurrences when they are reintroduced to their home environment (or different clinical settings). Thus, the stability of the symptom change is unclear.

Conclusion

Presently, LOS for adolescent inpatient care continues to decrease, and although effective for some, there may be unintended negative consequences for these more abbreviated programs. A patient-centered approach that tailors treatment duration to clinical and psychosocial history would likely result in longer hospital stays and incur greater costs for institutes and insurance companies in the short-term. However, it is critical to determine whether these greater short-term expenses result in longer-term economic and psychosocial benefits for institutes and patients, respectively.

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Table 1.

Clinical and psychosocial characteristics of adolescent inpatients

Diagnosis	N (%)	Boys	Girls
Unipolar mood	641 (82.6%)	162 (75.7%)	470 (85.5%)
Bipolar mood	41 (5.3%)	9 (4.2%)	31 (5.6%)
Psychotic disorder	5 (0.6%)	3 (1.4%)	1 (0.2%)
Anxiety disorder	462 (59.5%)	109 (50.9%)	347 (63.1%)
PTSD	119 (15.3%)	16 (7.5%)	99 (18.0%)
OCD	49 (6.3%)	13 (6.1%)	36 (6.5%)
ADHD	139 (17.9%)	53 (24.8%)	83 (15.1%)
Eating disorder	33 (4.3%)	3 (1.4%)	30 (5.5%)
Substance use disorder	44 (5.7%)	14 (6.5%)	30 (5.5%)
Internalizing disorder	543 (75.8%)	126 (66.3%)	409 (79.4%)
Internalizing-externalizing disorder	173 (24.2%)	64 (33.7%)	106 (20.6%)
Comorbidity	579 (74.6%)	149 (69.6%)	420 (76.4%)
Past month NSSI	422 (54.4%)	78 (36.4%)	337 (61.3%)
Lifetime suicide attempt	287 (37.2%)	60 (28.3%)	220 (40.1%)
Child abuse	258 (34.3%)	56 (26.8%)	195 (36.7%)

Note. PTSD = Post-Traumatic Stress Disorder; OCD = Obsessive-Compulsive Disorder; ADHD = Attention Deficit Hyperactivity Disorder; NSSI = Non-suicidal self-injury.

Only participants reporting gender as male or female were included in the table; however, there were also 12 transgender and 1 unreported gender patient.

Table 2.

Psychiatric symptoms assessed at admission and discharge

	Admission M (SD)	Discharge M (SD)	*t*(df)	*p*
Depressive symptoms	32.46 (14.293)	19.34 (12.599)	24.796 (543)	< 0.001
Anxiety symptoms	60.24 (19.113)	56.41 (18.344)	7.081 (512)	< 0.001
Suicidal ideation	10.21 (9.637)	5.0081 (7.101)	18.057 (601)	< 0.001