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Trauma as a Predictive Indicator of Clinical Outcome in Residential Treatment

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The present study was conducted to identify predictors of residential treatment outcome for youth. Data were collected and analyzed on multiple variables including each subject's psychiatric diagnoses, previous treatment attempts and success or failure in these respective settings, length of stay in prior treatment settings, past psychiatric hospitalizations, medication usage, trauma history, short-term and long-term treatment goals, and presenting symptomatology at admission to residential treatment. For this sample, analysis of outcomes data indicated that exposure to a variety of types of trauma was the single greatest predictor of improvement or deterioration in residential treatment.

KEYWORDS trauma, child, youth, residential treatment, outcomes, predictive indicator, *Devereux Scales of Mental Disorders (DSMD)*

Children with severe emotional and behavioral diagnoses have traditionally received treatment in an out-of-home setting such as a residential treatment program. Residential treatment facilities typically offer 24 hour care with an

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emphasis on treatment of emotionally and behaviorally disturbed children (Wells, 1991). The highly structured treatment milieu offered through residential treatment is intended as a last resort or response to symptoms and presenting problems that require care beyond the scope of community-based programs (Landsman, Groza, Tyler, & Malone, 2001). Although the focus of residential treatment can vary from program to program and from child to child, services typically include individual and group psychotherapy, multimodal interventions, and opportunities for youth involvement with their family and community. Client and staff communication is a fundamental aspect of the residential treatment process as such interaction often encourages clients to negotiate tasks of daily living and to respond to emotional and behavioral problems as they arise (Leichtman, Leichtman, Barber, & Neese, 2001).

Over the last twenty years, the preferred treatment modality for treating children with persistent psychological and emotional difficulties has evolved from restrictive inpatient care to broad-spectrum community-based care (Landsman et al., 2001). When investigating the effectiveness of these treatment methods from an outcomes and fiscal perspective, wrap-around community programs have displayed similar efficacy outcomes when compared to residential treatment settings, and can be provided at a significantly lower cost per client (Brown & Hill, 1996).

Yet, when community placements fail, is residential treatment a viable alternative? Despite past attempts to evaluate the effectiveness of residential treatment, conclusive assessment remains difficult, due in part to how clients' past placements and experiences play on treatment outcome. James et al. (2006) indicated "there is little empirical evidence that children enter such settings only after lengthy pathways in out-of-home care and a series of failed placements at lower levels of placement" (p. 198), meaning some children may be escalated to residential care before they are able to exhaust treatment attempts through less intensive community-based programs. Given the high cost and uncertain effectiveness of residential treatment, it is essential to identify those youth who are most likely to benefit from placement in a residential setting (Landsman et al., 2001; Wells, 1991).

Connor, Miller, Cunningham, and Melloni (2002) stressed the importance of assessing individual characteristics to identify youth who are most likely to benefit from residential treatment. It is also necessary to evaluate salient trends and traits of the population typically treated in residential treatment to determine which youth could benefit most from this type of treatment. Alexander and Huberty (as cited in Curtis, Alexander, & Lunghofer, 2001) collected data on 200 randomly selected children placed in residential group care and discovered that "most of the children studied had been physically or sexually abused, neglected, and lived in single parent families" (p. 381). English (as cited in Curtis et al., p. 383) discovered that children placed in

residential group care were significantly more likely than therapeutic foster care children to have a history of sexual abuse, and that females were significantly more likely than males placed in residential treatment to have histories of emotional abuse and sexual abuse. Findings that elucidate a prominent characteristic in a treatment population, such as presence of trauma history for many children placed in residential treatment, reveal information not only about the population, but also about the type of care this population may need to clinically improve. Likewise, Lyons, Libman-Mintzer, Kisiel, and Shallcross (1998) stated, "to successfully determine the appropriateness of residential care for those children placed in these settings, needs of recipient children must be assessed in a systematic, reliable, and clinically relevant manner" (p. 582).

Though research on predictors of outcome in residential treatment is lacking, some findings are available to explicate the factors that influence a youth's primary placement into restrictive care. James et al. (2006) examined the influence of several factors including demography, presenting health needs, behavioral and developmental functioning, prior treatment placements, and maltreatment history on youth placement into "intensive or restrictive settings" (p. 197) such as treatment foster care, group homes, residential treatment programs, and inpatient psychiatric facilities. Among other findings, James et al. revealed "four statistically significant predictors of entry into intensive or restrictive settings: male gender, older age, behavior problems, and fewer placements in other settings" (p. 196).

Once admitted into residential treatment, outcomes research suggests that some youth fail to improve, while others deteriorate during the course of treatment (Leichtman et al., 2001). Clearly, negative outcomes for children in residential treatment are a serious concern (Hoagwood & Cunningham, 1992; Lyons et al., 1998). Weitz, Sandler, Durlak, and Anton (2005) stress the importance of "understanding for whom, and under what conditions, interventions work best" (p. 640), which can be achieved by predicting and analyzing outcomes following treatment. Hoagwood and Cunningham note the availability of post-discharge community-based services for the client and his or her family as predictors of substantial positive treatment outcomes for the child. Landsman et al. (2001) state that providing "services in a family-centered fashion [and] maintaining a dual focus on the child and family" (p. 374) are critical implications for residential treatment practice. A shorter length of stay in residential treatment is also associated with increased stabilization for the child and family (Hoagwood & Cunningham; Landsman et al.).

Due to the varied nature of therapeutic programs, prognosis following treatment can be a difficult variable to systematically assess and reliably capture (Wells, 1991). Elucidation of variables that predict outcomes could allow providers to build a profile of optimal match between individuals and treatment settings.

STUDY PURPOSE

The present study attempted to reveal predictive indicators of clinical outcome in residential treatment through use of Devereux Scale of Mental Disorders (DSMD) (Naglieri, LeBuffe, & Pfeiffer, 1994) scale scores and a peer-validated index of demographic and clinical data on youth in a residential treatment program. The researchers hypothesized that youth with severe psychopathology and limited social or familial support would benefit most from engaging in highly structured, intensive residential treatment. Negative treatment effects and increased risk of recidivism were hypothesized to occur more frequently in youth with mild to moderate psychopathology improperly placed in residential treatment. Researchers sought to replicate the Hoagwood and Cunningham (1992) finding of an inverse relationship between length of stay in a residential treatment setting and clinical improvement. In addition, researchers examined how the presence or absence of trauma history, the number of types of trauma experienced as well as the combined effect of more than one form of trauma exposure prior to a residential treatment placement could affect a youth's outcome at the conclusion of treatment. Researchers also explored the potential impact of developmental differences on treatment outcome. Overall, researchers hoped to discover significant predictive indicators of clinical outcome that could be utilized in determining which youth would be best suited for placement in a residential treatment setting.

METHODS

Sample

The initial sample was comprised of all youth admitted to and discharged from a suburban residential treatment program between 1996 and 2006 for whom clinical outcomes data were available. Of the 155 potential participants, 46 were excluded from analysis due to insufficient data in medical and clinical records on key variables of interest. The final sample ($n = 109$) included subjects between the ages of 5 and 12 years at the time of their admission to the program ($M = 9.1$, $SD = 1.88$ years). Consistent with the composition of most residential treatment programs, 78.9% of the sample was male.

Predictive Factors

Researchers developed a peer-validated 60-item predictive index to systematically gather psychosocial, psychiatric, interpersonal, family systems; and demographic data from the clinical and medical records of the 109 eligible subjects. To compile the index, researchers reviewed residential treatment

literature and included variables for which prior research had yielded conflicting results, or for which there was a dearth of empirical research. Hypothesized predictors of clinical outcome included: subjects' history of trauma, length of stay, severity at admission, previous treatment attempts, and psychiatric diagnoses. Researchers collecting data were blind to the clinical outcome of subjects. To systematically control for peer validity, the principal investigator completed double-blind independent review of ten files for each researcher involved in data collection, compared results for consistency, and addressed any discrepancies. Periodically, researchers coded an additional sample of indexes and compared results to ensure the integrity of the data collected. Researchers used mean and modal substitutions to address missing data, which constituted less than five percent of the sample.

History of Trauma: Researchers collected data on the trauma history of each subject. This information was captured in medical and clinical records, specifically in admission documentation or clinical notes written by social work and clinical psychology staff. In the index, researchers dichotomously coded whether each subject experienced physical abuse, sexual abuse, witnessed domestic violence, or witnessed community violence. Overall exposure and history of trauma per subject was then determined by analyzing the data points in the index. No subjects had witnessed large-scale violence (e.g., terrorist attacks) or been exposed to natural disasters. The majority of the sample (71%) experienced at least one traumatic episode prior to admission, and 38.2% had experienced two or more types of trauma at the time they were admitted to the residential treatment program. Researchers hypothesized that children with trauma histories would improve in residential treatment with the assumption that these children would especially benefit from the relatively safe, stable, and structured environment of the program.

Length of Stay (LOS): Based on previous research (Hoagwood & Cunningham, 1992; Leichtman et al., 2001), researchers hypothesized that a shorter LOS would be associated with clinical improvement. For this sample, the LOS ranged from 4 to 83 months. The average LOS was 23.3 months ($SD = 13.4$ months).

Severity at Admission: Severity at admission was defined as the category ("Average," "Borderline," "Elevated," or "Very Elevated") of the subject's DSMD total t -score at admission. Since residential treatment is an intensive treatment setting, researchers hypothesized that subjects with "Elevated" or "Very Elevated" total t -scores would receive the most benefit from this type of treatment, compared to subjects with "Average" or "Borderline" total t -scores who might be better served in a less restrictive community-based setting. Therefore, researchers hypothesized that subjects without "Elevated" or "Very Elevated" levels of psychopathology would remain stable or deteriorate in a residential setting. The mean total t -score at admission was 63 ($SD = 13$), which falls in the "Elevated" psychopathology range. Admission total t -scores ranged from 40 to 96.

Previous Treatment Attempts: Researchers documented each subject's prior treatment history, including the number of past psychiatric hospitalizations, medication history, and utilization of outpatient and community-based services. Researchers expected that multiple prior treatment attempts would predict success in residential treatment, suggesting that residential treatment is most successful when families have exhausted all other treatment options. Eighty percent of children in this sample had been treated with medication prior to admission, 49.5% experienced placement in two or more foster homes, and 38.5% were previously treated in an outpatient context. The majority of children (79.8%) experienced at least one psychiatric hospitalization prior to admission, suggesting that in general, the sample was clinically severe, and families had largely explored other options before referring children to the present treatment program.

Psychiatric diagnoses: As an exploratory analysis, researchers documented the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)* (American Psychiatric Association, 2000) Axis I and Axis II diagnoses of each subject and examined the relation between the number and severity of diagnosis with treatment response. Diagnoses of interest included posttraumatic stress disorder (PTSD, 39.4% of the sample), mood and anxiety disorders (32.1%), mild and severe behavioral disorders (43.1%), psychotic disorders (13.8%), and attention deficit hyperactivity disorder (ADHD, 33.9%). All diagnoses were coded dichotomously.

Outcomes Data

Researchers evaluated clinical outcome using the DSMD, a 110-item behavioral rating scale that measures psychopathology in youth based on the frequency of specific behaviors over the past four weeks (Naglieri et al., 1994). Researchers selected the DSMD as a measure of outcome because it was the most widely used outcome measure in the residential program and had reasonably high validity and reliability (Smith & Reddy, 2002). The scale comprises 10 scores: 6 subscale *t*-scores, 3 composite *t*-scores, and a total *t*-score.

Subjects were evaluated using the DSMD within thirty days of admission and discharge from the residential program. To establish whether a subject had improved, deteriorated, or remained stable over the course of treatment, researchers compared the total numeric DSMD *t*-scores at admission and at discharge. Researchers used the dual criteria of statistically reliable and clinically meaningful change to evaluate treatment outcome. These criteria were operationally defined per the recommendations of the DSMD authors (Naglieri et al., 1994). Statistically significant change was defined as a discharge total *t*-score that fell outside the confidence interval of the admission *t*-score. Clinically meaningful change was defined as a discharge total *t*-score that fell outside the severity parameters of the admission total

t-score. Given that statistical assessments of outcome frequently fail to correspond to meaningful clinical improvement, dual criteria were used.

RESULTS

Each subject was categorized as “improved,” “deteriorated,” or “stable” based on whether he or she experienced statistically significant and/or clinically meaningful improvement or deterioration in treatment, as designated by the DSMD (Naglieri et al., 1994). If the subject met neither or only one criterion, he or she was designated “stable.” Forty-seven percent of subjects met the criteria for clinical change. Of those subjects, 63% improved in residential treatment, and 37% deteriorated. Of the many variables explored, trauma history was the strongest predictor of clinical change in residential treatment. Specifically, the more types of trauma a client experienced (categorized as no trauma, one type of trauma, two types of trauma, and three or more types of trauma), the less likely the client was to improve in residential treatment ($\chi^2 = 13.116, p < .05$) (Figure 1).

Seventy percent of subjects experienced one or more types of trauma prior to admission, including physical abuse (50%), sexual abuse (34%), witnessing domestic violence (36%), and witnessing community violence (5%). Thirty-two percent of subjects experienced one type of trauma in their lifetime (e.g. physical abuse alone), although they may have experienced that type of trauma on multiple occasions. Twenty-six percent of subjects experienced two types of trauma (e.g., physical abuse and sexual abuse). Twelve

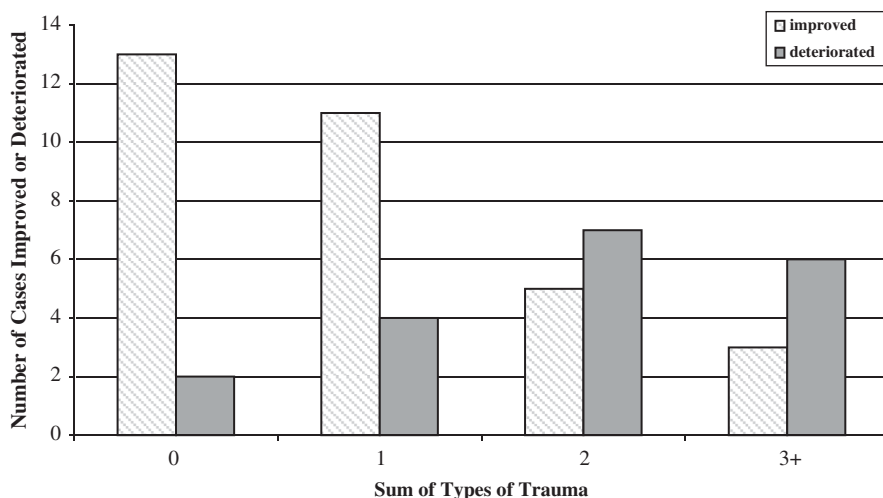


FIGURE 1 Sum of types of trauma exposure and clinical outcome.

percent of subjects had experienced three or more types of trauma prior to their admission.

Researchers examined whether children who experienced more than one type of traumatic experience differed significantly from children who experienced one or no types of trauma on other variables. Children who were exposed to two or more forms of trauma were significantly more likely than children with exposure to one or no types of trauma to carry a diagnosis of PTSD ($\chi^2 = 9.667, p = .002$). However, chi-square and ANOVA analyses revealed that children who experienced one or no forms of trauma and children who experienced two or more forms of trauma were comparable on other diagnostic categories and on age at admission, ethnicity, and number of past psychiatric hospitalizations (all $p > .1$).

Researchers explored whether one particular type of trauma or a specific combination of two or more types of trauma was predictive of clinical outcome. Physical abuse, sexual abuse, and witnessing domestic violence were not predictive of outcome, individually or collectively. However, clients who witnessed community violence were significantly more likely to deteriorate in residential treatment (Table 1). This finding should be interpreted cautiously, as the percent of the sample that witnessed community violence was very small (4.6%).

Compared to subjects who improved or remained stable, subjects who deteriorated during treatment appeared to have higher incidences of physical and sexual abuse. Though these findings are not statistically significant, they suggest that further research with larger samples may prove useful. Researchers also conducted several analyses of variance to examine differences in length of stay and severity at admission among clients who improved, those who remained stable, and those who deteriorated. No significant results emerged. Researchers investigated if prior treatment settings and psychiatric diagnoses could predict residential treatment outcome. The number of prior treatment contexts was unrelated to outcome in residential treatment ($F = 1.287, p = .283$). Analyses revealed no relationship between any specific psychiatric diagnosis or category of diagnoses and treatment outcome. Length of stay was not significantly related to outcome ($F = 0.220, p = .803$).

Developmental differences can play a significant role in a child's clinical presentation and response to treatment. Age at admission was negatively related to severity at admission, whereby younger age at admission predicted higher levels of clinical severity at admission ($r = -.293, p < .01$) and at discharge ($r = -.196, p < .05$). However, age at admission was not significantly related to the number of types of traumas the child had experienced, nor was it significantly related to severity at discharge after controlling for severity at admission ($r = -.098, p = .313$). Therefore, although developmental differences can play a significant role in a child's clinical presentation and response to treatment, developmental level does not appear to differentially relate to the variables of interest in this sample, and cannot fully explain findings from this study.

TABLE 1 Trauma Exposure and Clinical Outcome

Clinical outcome	Exposure to types of trauma (mode)	Physical abuse (% yes)	Sexual abuse (% yes)	Witness of domestic violence (% yes)	Witness of criminal violence (% yes)
Improved	No exposure to trauma	40.6%	21.9%	31.3%	3.1%
Stable	Exposure to 1 type of trauma	46.6%	34.5%	34.5%	0.0%
Deteriorated	Exposure to 2 types of trauma	73.7%	56.2%	47.4%	21.1%
Statistical analysis	$\chi^2 = 13.116^*$ $p < .05$	$\chi^2 = 5.655$ $p = .059$	$\chi^2 = 5.046$ $p = .080$	$\chi^2 = 1.439$ $p = .487$	$\chi^2 = 14.714^*$ $p = .001$

* = statistically significant.

DISCUSSION

Researchers sought to differentiate between youth who improved, remained stable, or deteriorated throughout the course of treatment as a possible result of internal or external predictive variables. Axis I and Axis II DSM-IV diagnoses, previous treatment attempts, past psychiatric hospitalizations, medication usage, history of trauma, length of stay, and presenting level of severity at admission were among the variables analyzed. Although almost half of the sample met the established criteria for clinical change, only 63 percent of these youth experienced positive clinical change, while the remaining 37 percent deteriorated over the course of treatment. These differences were consistent across gender.

An aggregate data collection method was implemented to allow researchers to consider the effect of individual types of trauma on treatment response as well as the deleterious impact of multiple traumatic experiences. Of the aforementioned subject characteristics and contextual variables that might impact treatment response, history of trauma was the strongest predictor of clinically and statistically significant change in residential treatment. Although majority of the subjects in the sample had a declared history of trauma, the types of trauma to which subjects were exposed to varied, and this variation specifically predicted response to treatment. In this study, the number of different types of trauma experienced was the strongest predictor of clinical change. The number of types of trauma a youth was exposed to prior to residential placement was negatively associated with treatment outcome. For example, if a youth was subjected to two types of trauma (e.g., physical abuse and sexual abuse, as compared to sexual abuse alone), the youth appeared to be less likely to improve in residential care. These findings suggest that exposure to varied forms of trauma is a key variable of interest in residential outcomes research.

Exposure to community violence was also related to poor treatment outcome. Of note is the finding that one child in this study was exposed to community violence days before admission to the residential program. This child deteriorated while in treatment, despite the presence of a stable environment. Although it is difficult to predict any significant patterns from one subject, this child's experience suggests that further study comparing children from stable and unpredictable environments and their reactions to community violence may present critical information on treatment for this specific population. However, due to the small portion of the sample that experienced community violence, this particular finding should be interpreted primarily as an area for future research.

The harmful effects of traumatic experiences may be represented through various manifestations over time, and recovery from early childhood traumas can require frequent and multimodal interventions (Foa, Keane, & Friedman, 2000). Faust and Katchen (2004) stated that, "severity,

length, and number of exposures to the trauma may not be the primary factor that dictates long-term psychological difficulties in survivors of prolonged trauma; there may be a number of variables external to the traumatic event itself that affect the traumatic response” (p. 428). Early intervention is essential, especially due to the amplified severity of individual effects from exposure to trauma at a young age. Faust and Katchen revealed that several studies have shown that persistent exposure to trauma led to the most severe effects when it occurred during the first ten years of life. Prompt assessment and proper placement are necessary subsequent processes to identify and treat possible sequelae of mental health consequences resulting from experience of traumatic events. Our data suggest that residential treatment programs may best serve clients by providing evidenced-based, trauma-informed treatment. Connor et al. (2002) suggested that, “youngsters with a history of abuse may respond best to a different, more focused, or more specialized type of treatment than is found in residential treatment” (p. 115). Clinicians should consider alternative treatment programs for those clients who exhibit characteristics that coincide with failure to improve in a residential treatment setting, such as extended exposure to complex trauma.

The researchers acknowledge several limitations of this study. The range of variables considered in the compilation of the predictive index included demographic, historical, contextual, and dynamic variables. Although such an approach allowed researchers to consider the relationship of several variables attributable to positive and negative treatment outcomes, only a moderate amount of detail could be collected for each potential indicator.

As a single-sample study, results must be interpreted cautiously; individual outcomes studies typically express information about subject-level findings and should not be interpreted broadly to evaluate the effectiveness of a system of care. Outcomes studies are also notoriously difficult to analyze in sum, as each study may consider a unique definition for outcome depending on the constructs of the study (Hooper, Murphy, Devaney, & Hultman, 2000). Further, the outcomes of this study reflect data collected from medical records compiled by a variety of clinicians and childcare teams. As a result of this and the differences in personal history between children, there is opportunity for variation on how the trauma and child history is reported. Lastly, due to the differentiation of the definition of outcome across individual studies, it is difficult to perform meta-analyses of outcomes findings, which would be the appropriate method for researchers to systematically evaluate the effectiveness of a specific treatment approach.

Many researchers have acknowledged the need for continuous research on providing adequate and effective treatment for traumatized youth. Chapman, Dube, and Anda (2007) stated that, “research limited to study effects of individual forms of abuse that are likely to co-occur frequently lacks criteria to clearly define the presence of abuse, and does not permit assessment of the cumulative impact of multiple childhood stressors” (p. 363). As reported above,

our most significant finding in this study was the effect of exposure to a variety of types of trauma. Courtois (2004) described complex trauma as trauma that “occurs repeatedly and cumulatively, usually over a period of time and within specific relationships and contexts” (p. 412). Depending on the individual’s exposure to complex trauma, impairment in affect regulation, dissociation, cognition, attachment, psychological, and physical domains can result (Cook et al., 2005). Researchers were unable to reliably capture the duration of exposure to a specific form of trauma and the context in which such trauma episodes occurred for each subject. Due to the intricate nature and varied effects of impairment in children exposed to complex trauma, researchers acknowledge that more comprehensive data collection is needed to properly assess the multifaceted short and long-term effects of exposure to complex trauma. Hence, further research is needed on the combined impact of multiple types of trauma and the resulting implications for treatment.

Significant findings in this study focused on the interplay of multiple forms of trauma as well as the impact such traumatic experiences can have for a youth in residential treatment. More detailed study of the relationship between severity of trauma history and a youth’s ability to benefit from restrictive care is needed to determine which traumatized youth could benefit from residential treatment and which youth might best be served in community-based setting (Rivard, Bloom, McCorkle, & Abramovitz, 2005). Additional independent variables may also need to be considered to fully understand the broad implications of trauma on clinical outcome for children. Due to the expensive, restrictive nature of residential treatment programs, meeting the challenges of appropriate treatment application is critical, if not imperative.

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