

Profile of Children Placed in Residential Psychiatric Program: Association With Delinquency, Involuntary Mental Health Commitment, and Reentry Into Care

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This study examined characteristics and profiles of youth receiving services in 1 of Florida's Medicaid-funded residential mental health treatment programs—State Inpatient Psychiatric Program (SIPP)—between July 1, 2004, and June 30, 2008 ($N = 1,432$). Latent class analysis (LCA) was used to classify youth, and 3 classes were identified: *Children With Multiple Needs*, *Children With No Caregivers*, and *Abused Children With Substantial Maltreatment History*. The results of LCA showed that *Children With Multiple Needs* experienced the greatest risk for adverse outcomes. Compared with youth in the other 2 classes, these children were more likely to get readmitted to SIPP, more likely to become involved with the juvenile justice system, and more likely to experience involuntary mental health assessments. Implications of the findings are discussed.

A substantial number of children with mental health diagnoses receive inpatient or residential mental health services (Brown, Natzke, Ireys, Gillingham, & Hamilton, 2010). Despite the availability of various home- and community-based mental health service options, at the national level an estimated 657,000 youth aged 12 to 17 years received residential mental health treatment between 2002 and 2006 (Substance Abuse and Mental Health Services Administration, [SAMHSA], Office of Applied Studies, 2008). Residential care remains an essential component of therapeutic intervention for youth with serious mental health problems (Connor, Miller, Cunningham, & Melloni, 2002) when other, less restrictive placements have not been successful or when youth are too severely disturbed to treat in community-based settings (Lyons, Woltman, Martinovich, & Hancock, 2009).

Although residential treatment fulfills a critical need, it is often viewed as an intervention of last resort for children with emotional and behavioral problems (Barth, 2002; Helgeson, Martinovich, Durkin, & Lyons, 2007), and it may have undesirable iatrogenic effects as well. For example, removal from the home may disrupt attachment bonds with parents or caregivers, and placement in unfamiliar surroundings may exacerbate existing emotional problems, such as anxiety (Wilmshurst, 2002). Residential care is also costly and highly restrictive, and there is considerable controversy regarding its efficacy (Heflinger, Simpkins, & Foster, 2002; Hussey & Guo, 2002; LeCroy & Ashford, 1992; Lyons, Terry, Martinovich, Peterson, & Bouska, 2001; Pottick, McAlpine, &

Andelman, 2000; Wilmshurst, 2002). For example, Bates, English, and Kouidou-Giles (1997) found that between 20% and 40% of youth placed in a residential setting did not show any improvement. In their retrospective study of 285 adolescents, Lyons and colleagues (2001) concluded that the effectiveness of residential treatment is limited to risk behaviors and depression and has unintended adverse outcomes for anxiety and hyperactivity. Wilmshurst (2002) concluded that children placed in residential programs appeared to have clinical deterioration for all internalizing symptoms, and Hussey and Guo (2002) found little behavioral change during the course of the treatment after examining outcomes of children in residential treatment.

In light of the high costs associated with residential treatment and its dubious effectiveness, it is important to examine the characteristics of youth admitted to residential treatment facilities and to identify those youths who are at increased risk for readmission or other adverse outcomes, such as involvement with the juvenile justice system, self-injury, and assaultive behavior. Moreover, there is a consensus among researchers regarding the alignment between efforts to better understand children's co-occurring problems and efforts to provide more specific and developmentally sensitive services (Berrick, Needell, Barth, & Jonson-Reid, 1998; McCrae, Chapman, & Christ, 2006; Waldfogel, 1998). Therefore, identifying groups among youth with different risks for such outcomes may be helpful in developing tailored interventions and specialized treatment that match these children's needs.

Factors Associated With Readmission to Residential Care

Several studies have examined factors associated with readmission. These studies consistently indicated that a shorter length of stay during the initial inpatient episode was associated with higher rates of readmission (Lakin, Brambila, & Sigda, 2008; Wickizer,

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Lessler, & Boyd-Wickizer, 1999). Similarly, studies have shown that older age and increased severity of mental health problems predicted child readmission to an inpatient or residential facility (Blader, 2004; Castilla-Puentes, 2008; Foster, 1999; Heflinger, Simpkins, & Foster, 2002; Romansky, Lyons, Lehner, & West, 2003). For example, Blader (2004) examined a sample of 109 adolescents residing in a small inpatient facility and concluded that severity of conduct problems was positively associated with risk for readmission. Lakin and colleagues (2008) examined 97 cases of residential discharge and concluded that severity of functioning at discharge measured by the CFARS (Children's Functional Assessment Rating Scale) and previous hospitalizations were significant predictors of readmission. In addition, specific mental health diagnoses, including attention deficit hyperactivity disorder (Heflinger et al., 2002; Kolko, 1992), oppositional defiant disorder, conduct disorder (Blader, 2004; Chung, 2008; Pavkov, Goerge, & Czapkowski, 1997), and depression (Foster, 1999) have been found to be associated with increased use of residential care. Other studies found that low parental involvement, corporal punishment, and parental stress were significantly associated with readmission (Blader, 2004). Finally, history of physical or sexual abuse and a prior history of hospitalization were shown to predict readmission (Chung, 2008; Connor, Miller, Cunningham, & Melloni, 2002; Heflinger et al., 2002).

Factors Associated With Juvenile Justice Involvement and Self-Injurious Behavior

Scant literature has assessed the relationship between placement in residential care and subsequent involvement in the juvenile justice system. Studies have shown that family characteristics, such as parental legal history, family substance abuse history, and child characteristics, such as presence of disruptive disorder, history of cocaine use, and history of aggressive behavior are significantly associated with juvenile justice involvement among youth who received inpatient treatment (Cropsey, Weaver, & Dupre, 2008). Research also suggests that poor delinquency outcomes are more common among youth with prior contact with the law and older males transitioning out of residential treatment programs (Cameron, Frensch, Preyde, & Quosai, 2011). However, compared with youth in the general mental health population, youth who received residential treatment were at no greater risk of being charged with a crime (Pullmann, 2010). Finally, in a study that examined the association between externalizing youth behavior while in treatment and subsequent criminal involvement, Lee, Chmelka, and Thompson (2010) found that compared with youth with no serious externalizing problems, the odds of legal involvement were significantly higher for gradual decrease (i.e., youth who demonstrated fewer problem behaviors over time), gradual increase (i.e., youth who showed an increase in problem behaviors over time), and low-level problem group youths (i.e., for youth with one or so serious problem behaviors each month).

Although previous studies have not explicitly examined predictors for involuntary mental health assessment among youth, such assessments are often predicated on reports of self-injurious behavior or suicidal attempts in Florida (Florida Mental Health Act of 1971, 2009). Because either of these behaviors can lead to involuntary mental health assessment, and a history of these behaviors is a likely marker for increased risk, studies that focused on

risk factors associated with either self-injurious behavior or suicide attempts were reviewed. For example, in a cross-sectional study of youth aged 14–21 residing in group homes, Strack, Anderson, Graham, and Tomoyasu (2007) demonstrated that White females were more likely than their peers to have attempted suicide. In a longitudinal study of adolescents who exited from a psychiatric inpatient facility, initial levels of suicidal ideation and the rate at which ideation reemerges were found to predict risks for future suicidal attempts (Prinstein et al., 2008).

While these studies have added to our knowledge about youth pathways into juvenile justice involvement and self-injurious behaviors among youth exiting residential mental health care, they examined these children as a single, homogenous group, an approach that is effective at exploring general tendencies but limits the ability to identify discrete groups of youth whose characteristics and outcomes differ from the overall pattern. Identifying specific combinations of characteristics—for example, service needs, risk factors, and demographic attributes—that differentiate relatively homogeneous subgroups of children served in residential mental health care settings may be critical for helping practitioners tailor interventions to specific needs and outcomes, to improving the risk assessment process, and to helping policymakers and practitioners determine how to best allocate scarce public resources to serve this vulnerable but high cost population of children. In addition, information about characteristics of children following specific pathways would greatly enhance our knowledge and provide a basis for prevention science.

Therefore, the current study seeks to address this gap in the literature by using a statistical technique known as latent class analysis (LCA) to determine whether there are (a) discrete, identifiable subgroups of children who received services in one of Florida's residential mental health treatment programs—State Inpatient Psychiatric Program (SIPP); and (b) whether there are differences among these subgroups of children in likelihood of subsequent readmission, involvement with the juvenile justice system, or involuntary mental health assessments.

About Florida's SIPP

Florida's SIPP is a residential program designed as an alternative to general psychiatric inpatient care. The program provides relatively short-term (less than 6 months) services in an intensive residential setting for high-risk youth under the age of 18 who have at least one *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* (American Psychiatric Association, 2000) diagnosis other than substance abuse, developmental disability, or autism. Youth admitted to SIPP are expected to benefit from residential treatment when a less restrictive setting is not available. The program focuses on increasing the number of days in the community, on utilization of community-based resources and family support, and on potential reduction of costs for inpatient care. The main goals of the program include: (a) reduction in the length of stay for psychiatric inpatient services in acute care general hospitals, (b) reduction of readmissions into acute or SIPP services, (c) stabilization of presenting symptoms, and (d) development of an effective aftercare plan (Armstrong et al., 2004).

Method

Sample Characteristics and Study Design

All children admitted to SIPP during fiscal year (FY) 2004–2005 through FY 2007–2008 were included in the study ($N = 1,432$). Of these youth, 57% were male. The average age was almost 14 years ($M = 13.83$, $SD = 2.32$). A majority of children (54%) were non-Hispanic White, an additional 27% were African American, and 10% were Hispanic, with the remaining 9% from other racial and ethnic groups. A substantial proportion of these youth (65%) were involved with the child protection system either before or during the study period, and 59% of these youth experienced out-of-home child welfare placements prior to admission to SIPP.

Data Sources

Data were obtained from several sources. First, Florida Medicaid claims administrative databases were used to obtain information on children's admissions to SIPP, mental health and physical health diagnoses, the types of mental health services received, and the dates these services were provided. Second, the Florida's Statewide Automated Child Welfare Information system (SAC-WIS) administrative database—the Florida Safe Families Network (FSFN)—was used to obtain information about child maltreatment reports, the results of child protective investigations, receipt of in-home or out-of-home child protective services, and the dates these services were received. Third, reports from law enforcement officers, certificates of mental health professionals, and court issued ex-parte orders about involuntary mental health assessments were obtained. Finally, Florida Department of Juvenile Justice (DJJ) administrative data sets were used for information about arrests and the dates the arrests occurred. These data were merged using children's social security numbers. The inclusion of child welfare administrative data and Medicaid claims was based on the importance that policymakers and program administrators place on these data. Because of the availability of information on almost all children involved in the child welfare system and information on almost all children who received mental health services, both the Florida Department of Children and Families and the Florida Agency for Health Care Administration often rely solely on administrative records when making policy decisions. Therefore, inferences about trends and impacts of specific programs such as SIPP can potentially be very useful to practitioners in their efforts to improve child outcomes and to meet legislative requirements. In addition, findings based on the state-level data may provide valuable information in policy-relevant research.

Measures

Child demographic characteristics. Child demographic characteristics included gender, age at the time of admission to SIPP, and race/ethnicity, which was categorized into non-Hispanic White, African American, Hispanic, and Other.

Mental health disorders. Mental health disorders were determined by examining children's Medicaid mental health

claims, which identify specific mental health diagnoses using International Classification of Diseases (ICD-9-CM) codes (American Psychiatric Association, 2000). These ICD-9-CM codes were grouped into six relevant categories based on their empirical prevalence in the study sample: (1) bipolar disorder, (2) attention deficit hyperactivity disorder, (3) adjustment reaction disorder, (4) conduct disorder, (5) depression, and (6) other disorders such as psychoses and schizophrenia, which were grouped into a single category because of the low prevalence of children (i.e., between 1% and 6%) with these disorders.

Comorbidity. Comorbidity is defined as the presence of two or more mental health diagnoses. A dichotomized variable was created to indicate whether a child had one mental health diagnosis, or more than one diagnosis based on the recoded ICD-9-CM codes.

Length of stay during first placement episode.

Number of days a child spent in SIPP during his or her first placement during the study period.

Child physical health diagnoses. The four chronic, physical health conditions most prevalent in children were included as separate indicators: (a) diabetes, (b) obesity, (c) asthma, and (d) congenital heart conditions. A fifth indicator denoted the presence of any other chronic clinical diagnosis.

Involvement with the child protection system (CPS). A dichotomized variable was constructed that indicated whether a child was involved with the child protection system; that is, the dependency case was opened (1 = yes) or not (0 = no) before or during the study period.

Child maltreatment type. For children who were involved with the CPS before admission to SIPP, indicators of maltreatment type were included. Four types of maltreatment as recorded in FSFN were examined: (a) sexual abuse, (b) physical abuse, (c) neglect, and (d) threatened harm. As described in Chapter 39, Florida Statutes (Proceedings relating to children, 2006), abuse was defined as any willful act or threatened act that results in any physical, mental, or sexual injury or harm that causes or is likely to cause the child's health to be significantly impaired. Neglect was defined as deprivation of necessary food, clothing, shelter, or medical treatment or a condition when a child is permitted to live in an environment when such deprivation or environment causes the child's physical, mental, or emotional health to be significantly impaired or to be in danger of being significantly impaired. Finally, threatened harm was defined as a behavior that is not accidental and is likely to result in harm to the child (State of Florida Department of Children and Families, 1998).

Absence of a caregiver. Although absence of a caregiver (e.g., incarceration or death of a parent) is not included in Florida Statutes as a type of child maltreatment, this category is recorded in the child information database because circumstances when a child is left without a caregiver require a protective response.

Severity of maltreatment incident. For children who experienced maltreatment, a variable ranking the severity of each type of maltreatment was included. This ranking follows previous work by Smith and Testa (2002), which categorizes abuse as the most severe type of maltreatment and threatened harm as the least severe. Absence of a caregiver was added to the scale because of the vulnerability of the child under these circumstances and because, like the “threatened harm” category, absence of a caregiver may lead to the potential harm of the child.

The severity variable includes presence or absence of a maltreatment type and the number of times each type of maltreatment occurred per incident (Yampolskaya & Banks, 2006). For this indicator, all cases were grouped according to the following criteria and ranked from most severe to least severe as follows: (a) those with any reports of abuse *plus* other types of maltreatment; (b) those with abuse only; (c) those with neglect *plus* other types of maltreatment excluding abuse; (d) those with neglect only; (e) those with threatened harm and absence of a caregiver and no other types of abuse; (f) those with threatened harm only; and (g) those cases where the only allegation was the absence of a caregiver.

Chronicity of maltreatment incident. For children who experienced maltreatment, maltreatment chronicity was measured by the number of maltreatment reports regardless of substantiation status received prior to the child’s admission to SIPP.

Previous child welfare out-of-home placement. Placement in out-of-home care was defined as any out-of-home placement before admission to SIPP because of involvement with the child protection system. A dichotomized variable was created with 0 = *child was not removed from the home* and 1 = *child was removed from the home and placed in child welfare out-of-home placement*.

Parental substance abuse problems. A dichotomized variable was constructed that indicated whether the child’s parent(s) had substance abuse problems (1 = *yes*) or not (0 = *no*) as recorded in the child welfare administrative data.

Outcome Measures

Readmission to SIPP. In this study, readmission was defined as an admission subsequent to discharge after the initial SIPP admission if the number of days between the discharge date from the initial episode and the subsequent admission was greater than 7.

Involvement with the juvenile justice system (DJJ). A child’s involvement with the juvenile justice system was measured by two variables (a) record of an arrest in the DJJ data set subsequent to discharge from SIPP and (b) record of placement in a secure juvenile justice facility after exiting SIPP. Both juvenile justice involvement variables were coded as 1 if the records indicated that the child had been arrested or placed in a secure facility (e.g., detention center, juvenile justice facility) at least once.

Involuntary mental health assessment. A dichotomized variable was constructed that indicated an involuntary mental health assessment after the last day of the first episode of stay in SIPP for a particular child.

Analytic Approach

LCA was used to describe the profile of youth served in SIPP and to identify the number of distinct groups receiving these services during the 4-year period from FY 2004–2005 to FY 2007–2008 (Clogg, 1995; Lazarsfeld & Henry, 1968). LCA is a cluster analytical statistical method for grouping individuals into latent classes based on observed categorical or continuous indicators (Bergman & Magnusson, 1997; Muthén & Muthén, 2000). A key assumption is that the population of children served in SIPP can be classified into latent classes, that is, qualitatively distinct subgroups (Ruscio & Ruscio, 2008).

Analyses were conducted in two stages. In the first stage, LCA with unconditional model (i.e., model that included no covariates) was conducted. The purpose of this stage was to compare models with one to *n* solutions and identify the number of latent classes, or qualitatively distinct subgroups within the population of children served in SIPP. During the second stage of analyses, covariates were incorporated into LCA in order to determine whether identified subgroups of children differed in their likelihood of experiencing specified outcomes (Collins & Lanza, 2010), including readmission into SIPP, involvement with the juvenile justice system, and involuntary mental health assessment after discharge. All analyses were conducted using Mplus version 6.1 (Muthén, & Muthén, 1998–2010).

Results

Among children admitted to SIPP during the study period the following five mental health disorder categories were found to be the most prevalent: bipolar disorder (28%), attention deficit hyperactivity disorder (18%), adjustment reaction disorder (13%), conduct disorder (12%), and depression (11%). Of youth first admitted to SIPP, 19% were readmitted during the 4-year study period, and 10% were readmitted within 1 year of initial discharge.

Results of Fitting Latent Class Model

Comparisons of unconditional models were made using information criteria fit indices including Akaike Information Criterion (AIC; Akaike, 1974), Bayesian Information Criterion (BIC; Schwarz, 1978), the Lo-Mendell-Rubin likelihood ratio test (LMR-LRT; Lo, Mendell, & Rubin, 2001), and entropy (Ramasswamy, DeSarbo, Reibstein, & Robinson, 1993), a measure of classification accuracy. The AIC is a measure of the goodness of fit of the estimated statistical model for the data and is defined as twice the difference between the number of free parameters and the maximum of the log likelihood. The BIC value is another measure of goodness of fit and balances two components of a model: the likelihood value and parsimony (Muthén & Muthén, 2000). Lower BIC and AIC values are indicative of a better fitting model. Higher entropy values indicate better classification accuracy, and a significant LMR-LRT (i.e., $p < .05$) indicates a model

significantly improved over a model with one less class. In addition, substantive interpretability of latent classes, that is the amount of new information gained with increased number of classes, how meaningful obtained classes are, and the estimated sample size of each latent class for various class solutions were assessed.

LCAs with one- to four-class solutions were conducted. The three-class model was determined to be optimal. Although moving from a three-class solution to a four-class solution resulted in smaller BIC and AIC values, an examination of the four-class solution indicated that this model created an additional fourth class that was too small ($n = 2$) to be statistically meaningful (Table 1).

During the second stage of the analysis, the three latent classes were compared in relation to their likelihood to be associated with readmission to SIPP, involvement with the juvenile justice system, and involuntary mental health assessment and were included in the conditional models as covariates. Specifically, a multinomial logistic regression was conducted where the categorical latent class variable was regressed on the three outcome variables. Thus, each class was compared with the other classes on probability of readmission, involvement with the juvenile justice system, and involuntary mental health assessment. Odds ratios were used to estimate the likelihood of these outcomes by a certain class of youth in SIPP.

Class Description

Three classes (i.e., groups) were revealed for children served in SIPP during the time period from FY 2004–2005 through FY 2007–2008: *Children With Multiple Needs* (Class 1); *Children With No Caregivers* (Class 2); and *Abused Children With Substantial Maltreatment History* (Class 3). Figure 1 illustrates the distinct profile for each latent class and the item probabilities that represent the likelihood of a child in each class having a particular characteristic.

Children With Multiple Needs (Class 1). *Children With Multiple Needs* (Class 1) represented 14% of the total number of children served in SIPP. The average age for children in this class was 13.6 years, 57% were males (vs. 63% and 50% for classes 2 and 3, respectively), with 51% of the class members being Caucasian and 8% being Hispanic. Children in this class spent on average 123 days in SIPP and had a much higher probability of having more than one mental health disorder (43%) compared with children in Class 2 and 3 (34%). As shown in

Figure 1, compared with children in the other two classes, *Children With Multiple Needs* (Class 1) have higher probabilities of experiencing adjustment reaction disorder and obesity. For example, children in Class 1 had 19% probability of having adjustment reaction disorder compared with 12% in Class 2 and 15% in Class 3. In addition, 7% of children in Class 1 were diagnosed with obesity compared with 4% of children in Class 2 and 3% of children in Class 3. Most of the *Children With Multiple Needs* (Class 1) were involved in the child protection system. For example, these children had an 87% probability of receiving any child protection services and a 77% probability of being placed in child welfare out-of-home care. Although children in Class 1 experienced relatively high maltreatment severity (4.2), none of these children were physically abused and almost all of them (99%) experienced neglect.

Children With No Caregivers (Class 2). *Children With No Caregivers* (Class 2) represented the largest group of children within the total sample (65%). Children in Class 2 differed from *Children With Multiple Needs* in Class 1 in several ways. First, *Children With No Caregivers* in Class 2 were slightly older, with an average age of almost 14 years old. They were also predominantly male (63%) and experienced a slightly higher probability of being diagnosed with bipolar disorder, conduct disorder, and other youth mental health disorders. For example, children in Class 2 had a 29% probability of being diagnosed with bipolar disorder (compared with 25% for *Children With Multiple Needs* and 28% for children in Class 3), a 13% probability of being diagnosed with conduct disorder (compared with 12% in Class 1 and 10% in Class 3), and a 9% probability of having another mental health disorder (compared with 7% for children in the other two classes). Although some *Children With No Caregivers* in Class 2 had a maltreatment history, the average level of maltreatment severity was only 0.3 (on a scale of 1 to 7). However, the distinguishing characteristic of this class is that these children had the highest probability of being left without caregivers (16% compared with 0% for children in the other two classes).

Abused Children With Substantial Maltreatment History. The final class of children, *Abused Children With Substantial Maltreatment History* (Class 3), represented 21% of the children in the SIPP sample. Children in Class 3 had a slightly higher probability of being diagnosed with attention deficit hyperactivity disorder (20% vs. 17% of *Children With Multiple Needs* in Class 1 and 18% of *Children With No Caregivers* in Class 2) and

Table 1. Model Fit for 1, 2, 3 and 4 Class Solutions

Fit index	One-class solution	Two-class solution	Three-class solution	Four-class solution
No. of free parameters	25	48	71	94
Bayesian Information Criteria (BIC)	36,255.669	33,491.515	31,710.722	30,854.326
Akaike information criterion (AIC)	36,124.034	33,238.774	31,336.876	30,359.375
Vuong-lo-Mendell-Rubin likelihood ratio test	NA	2,931.260	1,947.898	1,949.578
		$p < .001$	$p < .001$	$p < .001$
Entropy	NA	0.998	1.000	1.000

Note. NA = not applicable.

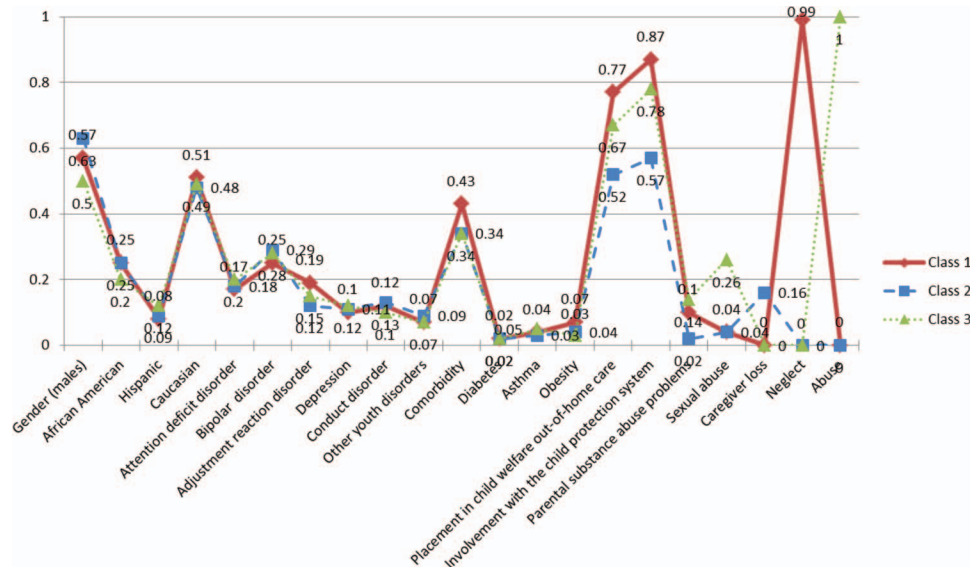


Figure 1. Conditional item probability profile of youth placed in State Inpatient Psychiatric program. Three-class solution. The color version of this figure appears in the online article only.

of having asthma (5%, vs. 4% of *Children With Multiple Needs* in Class 1 and 3% of *Children With No Caregivers* in Class 2). The most distinguishing characteristic for children in this class, however, was a history of physical abuse. All children in this class were physically abused (compared with 0% of the children in the other two classes), and 26% of them had a probability of experiencing sexual abuse (compared with 4% of children in Class 1 and Class 2). The level of maltreatment severity for these children was very high (6.5 out of a total possible score of 7). Almost all of the children in Class 3 received child protection services (78% compared with 57% in Class 2), and 67% were placed in child welfare out-of-home care. In addition, *Abused Children With Substantial Maltreatment History* in Class 3 had the highest probability of having parents with substance abuse problems (14% compared with 10% for children in Class 1, and 2% for children in Class 2).

Association With Youth Outcomes

Results indicated that compared with children in the other two classes, *Children With Multiple Needs* (Class 1) had a higher probability of subsequent readmission to SIPP (32% in Class 1 vs.

24% in Class 2, and 28% in Class 3). However, a significant difference was found only when Class 1 was compared with Class 2. Specifically, *Children With Multiple Needs* (Class 1) were 45% more likely (odds ratio [OR] = 1.45, $p < .05$) to reenter SIPP compared with *Children With No Caregivers* (Class 2). When *Children With Multiple Needs* (Class 1) were compared with *Abused Children With Substantial Maltreatment History* (Class 3), no significant difference was observed (Table 2).

Children With Multiple Needs (Class 1) were 78% more likely to get arrested after discharge from SIPP (OR = 1.78, $p < .05$) and were 73% more likely to be placed in a secure juvenile justice facility (OR = 1.73, $p < .05$) compared with *Children With No Caregivers* (Class 2). Compared with *Children With No Caregivers* (Class 2), *Abused Children With Substantial Maltreatment History* (Class 3) were almost twice more likely (OR = 1.85, $p < .05$) to get arrested and were more likely to be placed in a secure juvenile justice facility (OR = 1.19, $p < .05$).

Both *Children With Multiple Needs* (Class 1) and *Abused Children With Substantial Maltreatment History* (Class 3) had a 64% probability of subsequent involuntary mental health assessment, compared with only a 55% probability of involuntary assessment

Table 2. Association Between Probability of Class Membership and Readmission to State Inpatient Psychiatric Program (SIPP), Arrest After Discharge From SIPP, Placement in a Secure Juvenile Justice Facility, and Involuntary Mental Health Assessment ($N = 1,432$)

	Class 1 vs. Class 3	Class 2 vs. Class 3	Class 1 vs. Class 2
Readmission to SIPP	1.18 [−0.35 to 0.67]	0.91 [−0.60 to 0.18]	1.45 [0.94 to 2.25]*
Arrest after discharge from SIPP	0.95 [0.59 to 1.54]	0.54 [0.38 to 0.76]*	1.78 [1.19 to 2.67]*
Placement in a secure juvenile justice facility	1.45 [0.87 to 2.42]	0.84 [0.56 to 1.24]	1.73 [1.12 to 2.67]*
Involuntary mental health assessment	0.98 [0.60 to 1.60]	0.68 [0.48 to 0.97]*	1.45 [0.96 to 2.19]*

Note. Class 1 = Children With Multiple Needs; Class 2 = Children with No Caregivers; Class 3 = Abused Children with Substantial Maltreatment History. All associations are given as odds ratios (95% confidence interval).

* $p < .05$.

among *Children With No Caregivers* (Class 2). This difference was significant. As shown in Table 2, *Children With Multiple Needs* in Class 1 and *Abused Children With Substantial Maltreatment History* in Class 3 had almost one and a half times greater odds of experiencing involuntary mental health assessment than *Children With No Caregivers* in Class 2 ($OR = 1.45, p < .05$ and $OR = 1.47, p < .05$, respectively).

Sensitivity analyses examining class solutions when indicators were restricted to only maltreatment-related variables showed similar results. Specifically, approximately 14% of children were assigned to Class 1; 65% of the children were assigned to Class 2, and the remaining 21% were assigned to Class 3. A majority of the children in Class 1 (87%) were involved in the child protection system, experienced removal from home (77%), and experienced neglect as a type of maltreatment (99%). Almost 16% of children in Class 2 were left without a caregiver, and a great proportion of children in Class 3 were physically abused (21%) and experienced sexual abuse (26%). Latent multinomial logistic regression was conducted to examine significant associations between class membership and three mental health outcomes including readmission to SIPP, involuntary mental health examination, and self-injurious behavior. Similar to the findings obtained with all available variables included, *Children With Multiple Needs* (Class 1) were 45% more likely to be readmitted to SIPP compared with *Children With No Caregivers* in Class 2, $OR = 1.45$ ($0.45 - 1.07$), $p < .05$. Compared with *Children With No Caregivers* in Class 2, *Children With Multiple Needs* (Class 1) also were 45% more likely to experience involuntary mental health assessment, $OR = 1.45$ ($0.96 - 2.19$), and *Abused Children With Substantial Maltreatment History* in Class 3 were 48% more likely to have involuntary mental health assessment compared with *Children With No Caregivers* in Class 2, $OR = 1.48$ ($1.03 - 2.10$). In addition, a significant association was found between class membership and self-injurious behavior. *Abused Children With Substantial Maltreatment History* in Class 3 were 31% more likely to exhibit self-injurious behavior compared with *Children With No Caregivers* in Class 2 ($OR = 1.31$ [$0.93 - 1.85$]).

Discussion

In the present study, we sought to identify distinct subgroups of youth placed in one of Florida's residential mental health care programs, SIPP, and to examine those subgroups' associations with three outcomes including readmission to the program, involvement with juvenile justice, and involuntary mental health assessment. Findings revealed that children placed in Florida SIPP do not represent a homogeneous population but rather distinct subgroups that differ on key mental health and maltreatment history variables. The identified classes were distinguished both by the nature and the number of the problems youth had. Specifically, *Children With Multiple Needs* (Class 1) represent an important subpopulation of youth whose condition was characterized by multifaceted problems. Youth in this class had a much higher probability of having more than one mental disorder and a physical health problem. In addition, most members of this class had a history of child maltreatment and experienced removal from home before admission to SIPP. Given characteristics of this group, it is not surprising that this

is the smallest class in the sample, comprising only 14% of the youth. The second class identified by LCA comprised 65% of the study sample. The defining feature of Class 2 is that these children had the highest probability of being left without caregivers. Children in this class also had a high probability of having mental health problems. Combined with *Children With Multiple Needs* (Class 1), *Children With No Caregivers* had more mental health issues but less severe problems related to child maltreatment compared with *Abused Children With Substantial Maltreatment History* who represented Class 3.

The distinguishing characteristics of the third class are their substantial child maltreatment history and high level of maltreatment severity. These characteristics suggest that the emotional and behavioral issues exhibited by these youth were largely because of the history of violence against them and possibly trauma associated with this experience. Children in this class had one and one half times greater odds of experiencing involuntary mental health assessment and were almost twice more likely to become involved with the juvenile justice system compared with *Children With No Caregivers* (Class 2).

These findings are consistent with the results from previous studies indicating child maltreatment to be associated with symptoms of depression, subsequent suicide attempts, and more behavioral problems in adulthood (Colquhoun, 2009; Kaplow & Widom, 2007; Kim & Cicchetti, 2006). The results of this study, however, extend previous findings by demonstrating that child maltreatment experience is related to not only depression and suicide attempts but also leads to involuntary mental health assessment.

These findings also indicated that history and severity of child maltreatment were associated with subsequent delinquency among youth admitted to SIPP. Relatively consistent evidence suggests that the experience of child maltreatment is a strong predictor of juvenile delinquency based on samples drawn from a variety of populations, such as high school students, youth with emotional and behavioral disorders, and minority disadvantaged youth (Malmgren & Meisel, 2004; Mersky & Reynolds, 2007; Thornberry, Ireland, & Smith, 2001). However, results from this study suggest that trauma associated with child physical and sexual abuse may have a negative impact on a child's behavior resulting in involvement with the juvenile justice system, whereas the experience of other types of maltreatment, such as neglect or threatened harm, may not.

As might be expected, *Children With Multiple Needs* experience the greatest risk for adverse outcomes. Compared with youth in the other two classes, these children were more likely to get readmitted to SIPP, more likely to become involved with the juvenile justice system, and more likely to experience involuntary mental health assessment. This is consistent with the cumulative risk model, which asserts that the accumulation of risk factors was predictive of negative outcomes and that multiple maltreatment experiences increase the likelihood of such events (Rutter, 1979). Groups characterized by multiple needs, specifically co-occurring physical and mental health problems, as well as a history of child maltreatment are of concern to policymakers because the experience of multiple problems exacerbate the effect of risk factors and consequently worsen outcomes.

Limitations

Limitations of the study should be noted. First, the sample of children who received treatment in a residential facility was limited to only Florida's SIPP program. There may be greater variability and heterogeneity among youth placed in other residential mental health facilities. Therefore, profiles of youth in other similar residential programs have to be examined. Second, because the study relied on administrative data analysis, no individual measures of functioning were collected. Future studies should include youth personality characteristics, such as level of aggressiveness, fearlessness, and impulsivity in the latent class analyses and examine associations between latent classes and youth outcomes. Third, in the present study short-term outcomes (i.e., within a year after discharge from SIPP) were examined. Future research has to address this limitation. For example, it would be useful to examine longer term trajectories of arrests and involuntary mental health assessment and compare these trajectories for different latent classes. Such research would help in the identification of youth who are at greatest risk for developing psychopathology and long-term delinquency, and thereby facilitate intervention and treatment efforts.

Despite these limitations, to our knowledge, this is the first study to explore heterogeneous subgroups of youth admitted to a mental health residential program as well as to examine associations between different subgroups and outcomes. Second, the links between specific subgroups of youth receiving residential treatment and delinquency, as well as readmission were established. Finally, we are not aware of any previous study that examined the relationship between youth characteristics and needs and subsequent involuntary mental health assessment.

Implications

Findings from this research have clear implications for informing intervention and prevention programs that focus on improving outcomes for children admitted to residential mental health facilities. First, the results suggest that approximately 14% of children admitted to a residential program have multiple needs and issues. These children might benefit from interventions that use complex and varied strategies and focus simultaneously on multiple problems rather than a single behavior. Also, considering the diverse nature of the needs among children in this class, it is unlikely however that any single service system can effectively address them. Therefore, public service agencies including the department of juvenile justice, child welfare, mental health, and substance abuse agencies should improve strategies to coordinate service delivery to these children and their families, including the appropriate coordination of information and resources across programs and services.

Second, this study indicated that if not properly treated, these children will remain at high risk for repeated admission to a residential program, delinquency, and relapse of mental health problems leading to involuntary mental health assessment. Developing interventions that support parents during the transition from SIPP and help them to manage their children during these critical times may be an additional approach to improve outcomes in this group.

Third, findings from this study add further support to existing literature that a group of children with substantial maltreatment history have a similar high risk for both juvenile delinquency and involuntary mental health assessment (Grogan-Kaylor, Ruffolo, Ortega, & Clarke, 2008; Mersky, & Reynolds, 2007). Thus, interventions aimed at decreasing delinquency and other mental health related problems may benefit from a trauma-informed component aimed at reducing symptoms associated with trauma, attachment, traumatic grief, and trauma-related stress.

Fourth, evidence suggests that children who experienced child maltreatment and those with mental health problems are at risk for recurrence of maltreatment (DePanfilis, & Zuravin, 2002; English, Graham, Litrownik, Everson, & Bangdiwala, 2005; Marmorstein, 2010). This suggests that efforts should be made to increase prosocial support systems in the community to sustain positive outcomes and to increase access to services.

Finally, considering that absence of a caregiver has been shown to be associated with subsequent maltreatment (Yampolskaya & Banks, 2006), increased efforts and supports should be in place for children left without caregivers to prevent child maltreatment among this vulnerable population. Findings from this study can be used to influence general prevention policies by demonstrating that a population of youth admitted to residential programs represents different subgroups with the need for tailored interventions. Assessing co-occurring problems and needs of youth in residential treatment is critical to delivering the most effective services.

Keywords: mental health; residential care; latent class analysis

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