Chapter One

Experiences from the National Evaluation of the Comprehensive Community Mental Health Services for Children and their Families Program

Predictors of Child and Family Service Use in Systems of Care

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Introduction

A central question in children's mental health services research is how children and families use services in systems of care. One would expect that children served in systems of care would experience a broad range of services and continuity of care, and that their families would receive a variety of support services. Because caregivers are expected to be involved in their children's care, one also would expect that family factors would predict how children and families use services. Previous service utilization studies have found that service delivery systems can have profound effects on how children use mental health services (Summerfelt, Foster, & Saunders, 1996), and that client and family predictors of hospitalization may differ across delivery systems (Bickman, Foster, & Lambert, 1996). In addition, there is evidence that client and family factors predict the combination of outpatient, intermediate and residential services that children use in a continuum of care (Foster, Saunders, & Summerfelt, 1996; Foster, 1998) and in traditional community settings (Farmer, Burns, Angold, & Costello, 1997). When children are grouped by their service utilization patterns, it appears that child and caregiver variables predict membership in those groups (Lambert, Brannan, Breda, Heflinger, & Bickman, 1998; Brannan, in press). A youth's level of functional impairment (Hodges, Doucette-Gates, & Cheong-Seok, 2000), and previous treatment in an inpatient setting (Foster, Kelsch, Kamradt, Sosna, and Yang, 2001) have also been found to impact the setting in which services were received.

This study examines service use patterns of children with emotional and behavioral challenges and their families served in systems of care, including what services and supports are received, where services are provided, and what child and family factors predict service use.

Methods

Data were drawn from the national evaluation of the Comprehensive Community Mental Health Services for Children and Their Families Program. This program funds communities to develop systems of care through the Center for Mental Health Services (CMHS) within the Substance Abuse and Mental Health Services Administration of the federal Department of Health and Human Services. Children and youth ages 5 to 18 are enrolled in the longitudinal component of the evaluation. Caregivers of all children, and youth ages 11 and older are interviewed at intake into services and every 6 months thereafter for up to 36 months. Caregivers, ranging from biological parents to staff members, are defined as those individuals having the most contact with the child during the previous 6 months and best able to report about the child for that period. At the time of this analysis, 10 of 23 grant communities funded in 1997 and 1998 had collected some data at 6 months.

Sample

The sample for this study was 345 children or youth who had received system-of-care services for emotional and behavioral challenges in a grantee community whose caregivers had completed a 6-month follow-up interview. Nearly half of the children were ages 12 to 15 (45%), with 36% 5 to 11 years old, and 19% were 16 to 18 years old. Most children were Caucasian (62%) or African American (24%); 16% were of Hispanic origin, 4% were American Indian or Alaskan Native, 1% were Asian, and 16% were identified as having other ethnic backgrounds. Children were largely in their mother's custody (49%); 23% were with two parents, 4% with their father, 8% wards of the State, and 16% had other custody arrangements. Children were referred to services from mental health (34%), juvenile justice (27%), schools (17%), social services (9%), caregiver or self (5%), and other sources (7%). Diagnoses included attention deficit hyperactivity disorder (ADHD; 26%), mood disorders (16%), impulse control or conduct disorder (14%), oppositional defiant disorder (13%), adjustment disorders (10%), and other disorders (21%). Previous services included outpatient treatment (82%), medication for emotional or behavioral symptoms (68%); treatment in a residential treatment center or psychiatric hospital (32%), day treatment (17%), or alcohol or substance use therapy (17%).

Measures

Constructs included in this study were child and family service use variables, child symptoms and social functioning, caregiver strain, and family resources.

Multi-Sector Service Contacts (MSSC). Caregivers' reports of service use in a variety of locations were recorded at follow-up data collection points using a structured interview, the Multi-Sector Service Contacts form. The MSSC provides standard descriptions for 21 types of services, with names of services and service settings customized for each site. Once the type of service received has been identified, the MSSC records location, frequency, and sequencing of services, which provide information about flexibility in service provision and may indicate the extent to which services are provided through multiple agencies.

Child Behavior Checklist (CBCL; Achenbach, 1991). The Child Behavior Checklist was used to measure child symptomatology. The CBCL contains 17 social competence items and 113 emotional and behavioral symptoms. Caregivers rate their child on each symptom on a three-point scale ranging from "not true" to "very" or "often true." The CBCL has been used extensively and has demonstrated good reliability and validity. This study used the total internalizing and total externalizing (broad band) scores.

Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 1996). Child social functioning was assessed using the CAFAS, which assesses the child's level of functioning in eight life domains (e.g., school/work, community, and behavior toward others). The CAFAS was completed by trained raters who obtained information about the child from caregivers or through clinical experiences.

Caregiver Strain Questionnaire (CGSQ; Brannan, Heflinger, & Bickman, 1998). This instrument was used to assess the degree to which the caregiver experienced difficulties, strains, and other negative effects as the result of caring for a child with emotional or behavioral problems.

Family Resource Scale (FRS; Dunst & Leet, 1987). The 30-item FRS captures the respondents' perception of the adequacy of the household's resources such as money, personal and family time, and child care. The FRS was developed for use with families of children with disabilities and was found to have good internal consistency for the full scale.

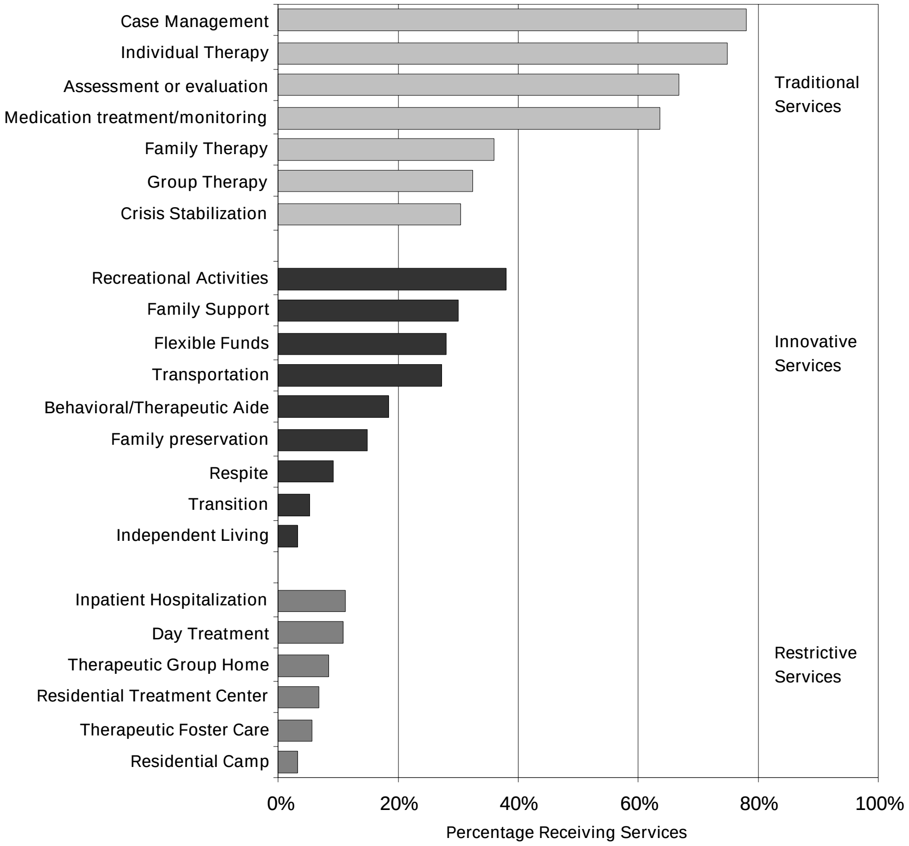
Analysis

Descriptive statistics were used to describe child and family service utilization patterns including the type of services used, and where and when those services were received. When appropriate, t-tests and chi-square tests were used to compare sub-groups. To examine which variables predicted service use, key service use variables served as the dependent variable including number of services received, and specific service receipt (medication treatment and monitoring, treatment in a restrictive setting, family therapy, family support services or respite, recreational services). Child gender and age, referral source, previous services, child functioning, child behavior (external and internal), family resources, and caregiver strain (total score) served as predictor variables. Multiple regression analysis was used to examine number of services received and logistic regression was used to predict receipt of specific services.

Results

Children and families received a broad array of services in the first six months after intake with the number of services received ranging from 0 to 16, with an average of 5.6 services (Figure 1). Services, if received, were largely initiated in the first 2 months in services. Traditional services most often received were case management (78%) and individual therapy (75%), followed by assessment/evaluation (67%) and medication treatment/monitoring (64%). Case management services were primarily provided in a mental health setting (55%) and in the family's home (40%), as was the case with family therapy (61%, 31% respectively). Assessment services were provided primarily in a mental health setting (70%), or at school (47%), as was individual therapy (72%, 16% respectively), and 79% of all medication monitoring occurred in a mental health setting. Group therapy was the service most frequently provided in a juvenile justice setting, family preservation was most often provided in a child welfare setting, and respite was primarily provided in the home of a respite worker. A limited number of children received more intensive services such as day treatment (11%) and inpatient hospitalization (11%), or services through a residential treatment center (7%), therapeutic group home (8%), or therapeutic foster care (5%).

Figure 1
Percentage* of Children and Families Receiving Services In First Six Months After Intake Into System of Care Services



* Number of children varies from 305 to 331

In addition to these traditional services, children and families made use of non-traditional services such as recreational activities (38%), family support (30%), flexible funds (28%), and transportation (27%). Most recreational activities were provided in a community location (62%). Family support services were utilized by 30% of families. These services were provided in mental health settings (47%), community locations (25%) and homes (25%). A smaller percentage of children received independent living (3%) or transition (5%) services, which may in part reflect the age distribution of the sample. Some difference were found among services provided by diagnosis and by referral source.

In the full regression model, the only predictor of total number of services received was younger age. Predictors of medication treatment and monitoring were younger age, mental health and school referrals, previous medication, and CBCL internalizing scores in the clinical range; predictors of treatment in a restrictive setting were younger age, previous day treatment or psychiatric hospitalization, and marked/severe CAFAS scores; predictors of family therapy were juvenile justice referral and CBCL internalizing scores below the clinical range; and predictors of recreational service use were male gender, and non-juvenile justice referral. None of the variables entered into the analysis predicted family support services or respite use.

Summary

These analyses are preliminary in nature since 6-month data collection is in the early stages in the national evaluation of communities funded in 1997 and 1998, and findings should be interpreted with caution. These results, however, suggest that functional impairment may appropriately predict treatment in restrictive settings, that children and families have an equal chance to receive innovative services, and that multiple factors affect medication treatment and monitoring. Although personal resources and caregiver strain did not predict services in these analyses, the lack of prediction by the CGSQ score may have been due to use of the total score rather than subscale scores which have been shown to have greater predictive ability (Brannan, et al., 1998). Further analyses with the larger sample, when available, is recommended, as is consideration of other factors that may affect service use such as other clinical characteristics and availability of services.

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Utilization Patterns and Costs Differences in a System of Care

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Introduction

This study examined the differences in service utilization, costs and clinical outcomes between children with severe and emotional disturbance (SED) who were identified for services through the school system and through other service sectors. Earlier studies have established that mental health and non-mental health agency referrals do not look the same in terms of demographic characteristics, presenting problems and clinical severity at the point of service initiation (Walrath, Nickerson, Crowel, & Leaf, 1998). Subgroup differences at the point of service initiation may impact service planning and delivery, which may result in differential outcome (Walrath et al., 1998). This study divided children at a system of care site into two subgroups based on whether they were referred by the school agency or by other agencies. We examined whether subgroup differences at the point of service initiation have an impact on service delivery and clinical outcome.

Method

Service records and their costs were extracted from the management information system at a system of care site for 125 children who consented to participate in the national evaluation. Of the 125 children enrolled in the study, the Child Behavior Checklist (CBCL; Achenbach, 1991) was completed at baseline and six-month follow up for 92 children. All analyses were conducted on data gathered from these 92 children, of which 32 were school referrals and 60 were non-school referrals. The analyses consisted of four steps.

The first step was to describe the sample. Demographic, symptom and function differences at baseline between the school referral and non-school referral groups were examined. The demographic variables of interest were age, gender, and ethnicity. Symptomatology was measured by the CBCL total problem score, and Functionality was assessed using the Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 1990) total score of 5-subscales.

The second step examined differences in pattern of service use between the two groups. Services were classified into one of seven categories corresponding to: 1) Family Collateral, 2) Non-Family Collateral, 3) Individual Therapy, 4) Group Therapy, 5) Day Treatment, 6) Residential, and 7) Other. Collateral service include, but are not limited to, helping either support persons or immediate family members, to understand and accept the child's condition and involving them in service planning and implementation of service plan. For each referral group, the percentage of service encounters in each of the seven categories was calculated by dividing the total number of service encounters in each category by the total number of service encounters.

The third step examined differences in intensity of service use and in costs of service for the first six-month period between the school referral and non-school referral groups. The intensity variable was defined as the number of units of service use divided by 180, which was the number of days in the first six-month period. A total cost figure was calculated for each child by adding all billable services that a child received within that period.

The fourth step was to examine the effect of intensity or costs on six months outcome, as indicated by CBCL total problem scores. Regression models, using SAS Proc GLM (SAS Institute, 1989), were built with CBCL total problem score as a dependent variable and group, intensity, costs, and baseline symptom and function scores as independent variables.

Results

The school referral group differed demographically from the non-school referral group. The school group was younger than the non-school group, with 68.7% of children between the ages of 6-12, compared to 11.7%, respectively. Only 31.3 % of the school group were 12 to 17 years old compared to 88.3% of the children in the non-school group. The age differences were statistically significant (Chi-square = 31.5, $df = 1$, $N = 92$, $p < .0001$). Boys were overrepresented in the school group and out numbered girls 3 to 1. The non-school group had a 50/50 split between boys and girls. Gender differences were statistically significant (Chi-square = 5.38, $df = 1$, $N = 92$, $p < 0.02$). An analysis of ethnicity revealed that 68.7% of the school group were Caucasian, compared to 45.8% in the non-school group. This difference was statistically significant (Chi-square = 4.41, $N = 92$, $df = 1$, $p < 0.03$).

Baseline differences in symptom and function between the school group and non-school group was examined using the CBCL total problem score and the CAFAS 5-Scales Total Score. Significant differences between the two groups were found for the CBCL total problem score ($t(90) = 3.11$, $p < 0.01$), but not for the CAFAS total score. In short, there were differences in symptom levels between the school group and non-school group, but not in functional levels.

The pattern of service use was also different between the two groups. Table 1 shows the percentage of service encounters for each of the seven service categories by referral group. The school group received more family collateral (21.7% vs. 11.5%) and more non-family collateral services (28.2% vs. 23.6%) than the non-school group. The school group also received more residential placement (16.1% vs. 4.7%) than the non-school group. The school group received less individual therapy (16.2% vs. 22.5%), less group therapy (1.3% vs. 12.4%) and less day treatment (5.5% vs. 13.4%). Other services, such as medication support, psychological testing, and plan development, were similar between the school and non-school referral group (11.0% vs. 11.9%).

Intensity of service use was defined as the average number of units (in minutes) used within the first six months of enrollment into the study. The school group received 74 minutes per day compared to 82 minutes per day for the non-school group. However, the standard deviation was large for both groups, 120 minutes for the school group and 116 for the non-school group. The difference in intensity between the two groups was non-significant, $t(92) = -0.29$.

Table 1
Pattern of Use

	School Group (N = 32)		*Non-School Group (N = 60)*	
Service Category	*Total Encounters*	*Percentage*	*Total Encounters*	*Percentage*
Family Collateral	609	21.7	726	11.5
Non-Family Collateral	791	28.2	1,490	23.6
Individual Therapy	453	16.2	1,424	22.5
Group Therapy	35	1.3	786	12.4
Day Treatment	155	5.5	850	13.4
Residential	450	165.1	297	4.7
Other	309	11.0	753	11.9
TOTAL	2,802	100%	6,326	100%

Costs were calculated by adding together all the costs for a child in the first six months of service. The average total costs per child for the school group was $6,190 (*std* = $6,019) and for the non-school group was $8,506 (*std* = $5,666). The difference in average total costs per child between the school group and non-school group was not significant, t(92)= -1.83.

A series of multiple regression models were used to examine the relationship between symptom level at six months and intensity of service use or costs of service used. Intensity of service use and costs of service used were highly correlated and co-linearity would occur if they were placed simultaneously in the same model. Thus, two separate models were built, one with intensity and one with costs. The dependent variable was CBCL total problem score at six months. The independent variables were referral source (i.e. school or non-school group), age, sex, race, and baseline CBCL total problem score. In addition, intensity was added as an independent variable in one model and costs in another model to examine the contribution of services and costs to outcome. Table 2 reported the beta estimates and standard errors for the two models. The only significant predictors of symptom score at six months were baseline symptom score and ethnicity. Neither intensity of service nor total cost of service were significant predictors of symptom score at six months. Referral sources, age and gender were also non-significant predictors of CBCL total problem score at six-month.

Table 2
Regression Models Predicting CBCL Total Problem Score at 6-month

	Model 1 *Beta*	*Model 2* *Beta*
Intercept	15.73*	16.62*
Group	-2.70	-2.41
Age	-0.01	-0.02
Gender	-1.28	-0.98
Race	-3.94*	-3.92*
CBCL	0.76***	0.76***
Cost	0.00	—
Intensity	—	0.06

Reference for Group is non-school, Sex is female, and Race is Caucasian. Significance is indicated by *$p<.05$, ***$p<.001$. N=91 for both models. For Model 1, R^2=.55, F(6,84)=17.47, $p<.0001$; and for Model 2, R^2=.55, F(6,84)=17.19, $p<.0001$

Discussion

This study examined differences in service use, costs and outcome between school referral group and non-school referral group. Differences in demographic characteristics, symptom scores and function scores were found at baseline. Only the differences in function scores between the two groups were statistically non-significant. Differences between the school group and non-school group in terms of age, gender, ethnicity, and symptom scores at baseline were statistically significant, indicating a need to adjust for these factors in later regression analyses. Children referred by the school system used services differently than did children referred from other sources. The school group used more collateral services and residential placement than the non-school group. The school group used less individual and group therapy, as well as day treatment, than the non-school group. In addition, the school group received less service hours, on the average, than the non-school group. The combination of the type of service and the hours of service used resulted in less cost for the school group compared to the non-school group. Multiple regression analyses showed that the differences in symptom scores between the school group and the non-school group was accounted, for the most part, by the baseline symptom scores. Ethnicity, as defined by Caucasian versus Other, was the only other significant predictor of symptom scores at six months. Neither referral source, intensity of service use, nor costs predicted six months symptom scores after adjusting for baseline scores.

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Modeling Change in Caregiver Reports of Behavioral and Emotional Symptoms

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Introduction

Traditionally, outcome studies within the behavioral sciences have focused primarily upon determining the degree to which a specific behavior has changed as a result of some form of intervention. Equally significant, however, is the question of how the behavior has changed over the course of the assessment and what factors significantly influence this change. The present study seeks to model change in symptomatology over a 24-month period for 948 children who participated in the first phase of the national evaluation of the Comprehensive Community Mental Health Services for Children and their Families Program funded by the Center for Mental Services (CMHS) at the Substance Abuse and Mental Health Services Administration (SAMHSA).

Two primary research questions are addressed in this study. The first question addresses within-groups growth: Does child symptomatology change over time in children with severe emotional disturbances who are receiving services through CMHS-funded systems of care? The second question addresses growth between subjects: Are changes in child symptomatology over time systematically related to selected characteristics of child background?

In order to answer these questions, a growth curve method of modeling individual change was utilized. Hierarchical linear modeling (HLM), has been noted as being a more accurate method of analysis in the assessment of change (Willett & Ayoub, 1991). This is primarily due to the method's ability to model growth over multiple time points, providing valuable information on temporal changes in behavioral outcomes. In contrast to pre-test/post-test score methods of analysis in which change is viewed in increments, growth curve modeling allows change to be conceptualized as a continuous process and thus allows for the statistical analysis of multiple waves of data (a minimum of 3 observations is required). Using HLM 5.0 (Bryk & Raudenbush, 1992), a two-level growth curve model was used to model change within the present study.

Methodology

Participants

Data were obtained from the longitudinal outcome study component of the national evaluation of the Comprehensive Community Mental Health Services for Children and Their Families Program. This component of the evaluation seeks to examine the effects of the system-of-care approach on child and family outcomes. Data were collected from each participant within 30 days of entering the service system and then at follow-up every six months throughout the five year duration of the grant. The total number of children and adolescents in the data set was 948. The mean age for the sample was 13.7 (*SD* = 2.53) years with the largest percentage of children being between the ages of 13 and 18 (74.9%), followed by those children between the ages of 7 and 12 (24.5%). The remaining participants were less than 6 years old (1.5%). The sample was predominantly male (71.0%), and the largest ethnic group represented was White, non-Hispanic (60.9%), followed by Hispanic (18.0%), African American (10.4%), Native Hawaiian (3.0%), Native American/Alaskan Native (4.3%), and Asian/Pacific Islander (1.5%). Nearly half of the youth were in the legal custody of their mothers (47.2%), with a quarter of the youth (23.7%) in the custody of both parents, while 8.5% were within the custody of legal guardians. Over half of the sample (54.0%) were members of families having incomes of less than $15,000 per year.

Overall, youth in the sample were found to have over 13 primary diagnoses, each falling within the broad range of Severe Emotional Disturbance (SED). Conduct related disorders were reported most often (41.1%), followed by depression/dysthymia (23.1%), attention deficit hyperactivity disorder (17.9%), and anxiety related disorders (6.8%). In terms of comorbidity, 44.0% of the sample had co-existing conditions.

Over 30 presenting problems were reported for participants in the sample. The most commonly reported presenting problems were physical aggression (18.1%), noncompliance (13.6%), hyperactive impulsive problems (7.5%), and substance abuse (7.9%).

A total of ten various referral sources were reported. The most common referral source was corrections (19.5%), followed by mental health agencies (18.6%), social service agencies (15.8%), schools (14.5%), parents (7.9%), courts (6.9%), self (4.2%), physicians (2.6%), private therapists (1.9%), and other (8.1%).

The average number of risk factors for the sample was 4.7 (*SD* = 2.64). Level of functioning difficulties among the children and youth in the sample was assessed by the Child and Adolescent Functional Assessment Scale (CAFAS; Hodges, 1994). Children in the sample had an average CAFAS score of 112.29 (*SD* = 43.3), and reported an average length of time in the service system of 611.32 days (*SD* = 377.7). The average number of contacts with the legal system for the sample was 4.0 (*SD* = 6.92).

Instruments and Procedures

As participants in the national evaluation, all youth in the sample had been administered the Child Behavior Checklist (CBCL; Achenbach, 1991) at least twice, yet no more than four times within the 24-month timeframe. The CBCL is a standardized measure to assess clinical symptomatology and behavioral competence for children 4 to 18 years of age. A caregiver report measure, the CBCL consists of 113 behavior problem items in addition to 17 social competence items. Child symptomatology is assessed on a continuum, producing two broad band syndrome scores, eight narrow band syndrome scores, measures of three behavioral competencies, and a total problem score and a total competence score. The CBCL has been used in numerous research studies and has been noted as having high levels of reliability and validity (Lowe, 1998).

Analysis

In the present study only the total problems score of the CBCL was analyzed. At the first level of HLM used for this analysis, individual growth curves were generated for each child in the sample to model change in symptomatology over time. At the second level of the model the intercepts and slopes from the level-one model were treated as outcome variables. The model building process involves the determination of an unconditional model to assess the amount of variability in intercepts and slopes among individuals at level 2 prior to developing the predictive model. If significant variability is found to exist between the intercepts and slopes, predictor variables can be added to determine if differences in initial values and rates of change are attributable to specific individual level factors. A representation of the two-level model used in the present study is provided below:

Level 1 $Y = P_0 + P_1*(\text{TIME}) + e$
Level 2 $P_0 = \beta_{00} + \beta_{01}*(\text{Predictor A}) + \beta_{02}*(\text{Predictor B}) + \ldots\ldots + R_0$
$P_1 = \beta_{10} + \beta_{11}*(\text{Predictor A}) + \beta_{12}*(\text{Predictor B}) + \ldots\ldots + R_1$

In the present study, level 1 modeled initial symptomatology as indicated by the CBCL Total Problems *T*-Score (P_0) and change over time (P_1). Level 2 modeled the intercepts and slopes from Level 1 and incorporated the coefficients for the specified predictor variables. Potential predictors included gender, age, race, length of time in system of care, income level, number of contacts with law enforcement, custody status, comorbidity, level of functioning difficulties, and presenting problem.

Results and Discussion

In order to determine the average rate of change for child symptomatology over the 24-month timeframe, an unconditional (without predictors) two-level growth curve model was generated. The unconditional model indicated the amount of variance among the intercepts and slopes for the children in the sample. Results of the unconditional model indicated significant variability among children in Total Problem CBCL *T* scores at entry into services, $\chi^2(512) = 977.24$, $p < .001$, $SD = 26.70$, and in change-rates over time $\chi^2(512) = 596.72$, $p = .006$, $SD = 4.82$. Ten of the fourteen individual-level characteristics examined were found to be significant predictors of the children's initial Total CBCL score. However, only three of the fourteen were found to be significant predictors of the slope. A summary of significant predictor variables is provided in Table 1. In terms of direction and rate of change, the average ordinary least squares coefficient for the intercept was 72.12, while the average ordinary least squares coefficient for the slope was -6.47, indicating that on average, children improved 6.47 points per six-month period.

The findings of the present study are similar to previous research focusing upon individual changes in symptomatology and the factors that influence change. Although numerous factors both at the system level and the individual level have been hypothesized as having some influence upon outcomes for children with severe emotional disturbances (Burns, 1996), efforts to empirically substantiate these theorized relationships have produced inconsistent findings (Bickman, Lambert,

Table 1
Final Estimation of Fixed Effects

Fixed Effect	*Coefficient*	*Standard Error*	*T-Ratio*	*Approximate d.f.*	*P-Value*
For Intercept (BO) (Initial CBCL Score					
Male	-4.036	1.978	-2.040	936	0.041
Age	-2.184	0.377	-5.801	936	0.000
Length in SOC	-0.008	0.004	-2.259	936	0.024
Comorbidity	3.794	1.824	2.080	936	0.037
CAFAS	0.275	0.030	9.072	936	0.000
Non Minority	7.828	1.880	4.165	936	0.000
Custody of Mother	4.801	1.780	2.697	936	0.007
Non Compliance	5.561	2.611	2.130	936	0.033
Hyperactive/Impulsive	6.649	3.374	1.971	936	0.048
Sucicidal Ideations	14.765	6.885	2.144	936	0.032
For Timeframe/slope (B1) (Rate of Change)					
Length in SOC	0.006	0.002	3.144	943	0.002
CAFAS	-0.058	0.002	3.774	943	0.000
Suicidal Ideation	4.834	2.494	1.940	943	0.052

(with robust standard errors)

Andrade, & Penaloza, 2000). The present study revealed significant variability among the rates of change for the children in this sample, and initial severity of functional impairment differentiated individuals in terms of their variability in change rates. Additional inquiry should focus upon further identifying specific individual characteristics that can account for change over time, and should examine system-level factors that can account for variation in change rates across systems.

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A Comparison of Services Delivered and Costs Incurred in a System of Care and a Traditional Service System

E. Michael Foster
Tim Connor
Hoang Thanh Nguyen

Introduction

Results from the Fort Bragg Demonstration suggest that improvements in the delivery of mental health services are not necessarily self-financing; better services are not necessarily less costly (Foster, Summerfelt, & Saunders, 1996). Even after allowing for between-site differences in access, expenditures on specialty mental health services at the Demonstration were substantially greater than at the comparison sites. Critics have argued that this perspective is somewhat narrow (Pires, 1997); it does not reflect cost savings in other child-serving sectors potentially generated by the Demonstration. The Fort Bragg study could offer only limited evidence on this score. The study did include self-reports of involvement in other child-serving sectors, such as special education and juvenile justice. These reports are difficult to interpret. In addition to potential inaccuracies afflicting self-reports, large between-site differences existed at baseline (Bickman et al., 1995). The study did include insurance claims data concerning the child's use of health services and the use of mental health services by other family members. The effect of the Demonstration on those expenditures was very modest and did not fully offset increased expenditures on mental health services for children served at the Demonstration (Foster & Bickman, 2000). While one would expect any potential cost savings to be mediated by between-site differences in mental health outcomes, it remains possible that cost savings not otherwise captured offset to some extent the greater expenditures on mental health services.

For this reason, a key question underlying the national evaluation of the Comprehensive Community Health Services for Children and their Families Program involves the impact of improved service delivery on expenditures by other child-serving agencies. Unlike the Fort Bragg Demonstration, the grantees are true systems of care that actively involve other agencies, such as child welfare, juvenile justice and special education. For that reason, the impact on expenditures by those agencies is potentially greater.

This summary reports preliminary findings from a study of the impact of systems of care on children's involvement in other child-serving sectors. These efforts have been focused on one of the so-called comparison pairs, the two Ohio Sites. While we cannot report expenditure levels at this point, we can report differences in system involvement.

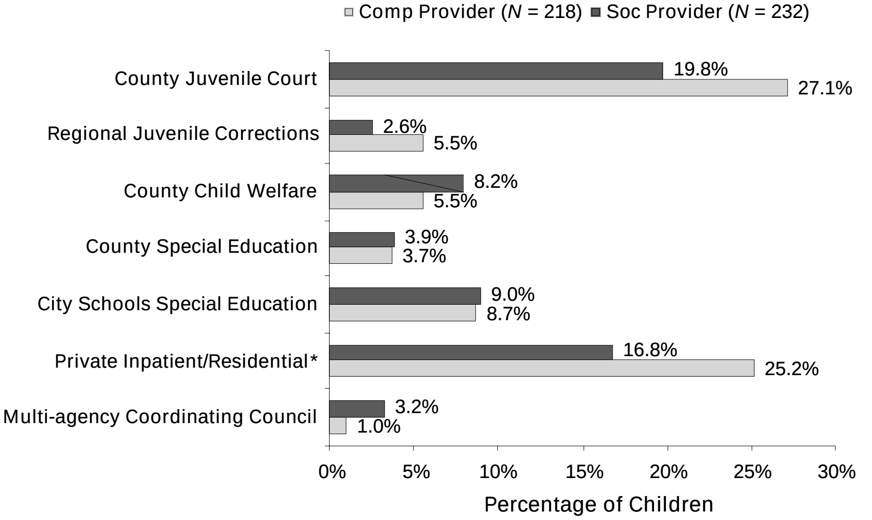
Method

The National Evaluation collects management information system data from the mental health agencies in study communities. These databases are available for both Stark County (the grantee) and Youngstown (the comparison site). However, those databases suffer from key omissions—namely, they provide data on neither residential psychiatric care nor on other child-serving agencies.

For this reason, we undertook a series of record reviews at the major residential service providers and key child-serving agencies in the study communities. This record review covered service use from 1997 through 2000. The data cover only those services received while participants lived in study communities; services received by individuals who moved to other areas of Ohio or out of state are not included.

Participating agencies and providers include four local residential providers (two in each community) as well as agencies in the juvenile justice, child welfare and special education sectors. In the case of juvenile justice, data were obtained from county juvenile court as well as from the regional juvenile corrections authority. Information on out-of-home placements was obtained from the

Figure 1
Placements with Other Local Child-Serving Providers after Study Entry



* Figures represent placements for the entire 1997-2000 period.
Tampa 2001/Preliminary.

county child welfare offices. School districts in the cities and counties involved provided data on special education placements.

All agencies contacted provided data, either in the form of a management information system or a hard copy summary. Information provided included date and types of service. In some instances, information on expenditures on those services was also available.

Results and/or Discussion

For children at Stark (*n* = 232) and Youngstown (*n* = 218), we were able to calculate rates of inpatient use and involvement in the other sectors in the 12 months following study entry. As figure 1 makes clear, children at the comparison site were substantially more likely to have been involved in county juvenile court ($p = .08$) as well as private inpatient care ($p = .04$). (Significance levels were determined using the two-sided Fisher's exact test.)

These results are preliminary for several reasons. First, in the key case of residential services, the record review data have not been entered into a computer database. For that reason, the analysis is not limited to the 12-month followup period. The differences in service use could reflect pre-existing differences among study children stemming from site differences in recruitment, for example. Furthermore, the coverage of special education services is not complete. We were able to obtain special education records for the two cities (Canton and Youngstown) as well as the county-level agencies providing services to children in rural areas. We were unable to record data from school districts in small towns that provided their own special education. As this study moves forward, the research team is addressing these and other limitations by obtaining additional data and by conducting further analyses.

The findings presented here suggest that higher expenditures on mental health services could be offset by savings in other child-serving sectors. It remains to be seen whether those savings are large enough to provide an economic rationale for systems of care. As this study moves forward, we hope to provide a definitive answer to this question.

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Recruitment Challenges and Effective Strategies: Balancing Scientific and Practical Issues in Quasi-Experimental Designs

Elizabeth Grossman
Tim Connor

Introduction

Historically, the literature on mental health services research has underscored numerous problems with recruitment and retention. Because power to detect differences from a particular service intervention is based on sample size (Motzer, Moseley, & Lewis, 1997), recruitment of an adequate number of study participants is critical to the success of any longitudinal research design. An integrated management approach to maximizing respondent recruitment efforts has been discussed in the context of services research in previous literature (Capaldi & Patterson, 1987). In the area of mental health services research, recruiting children with serious emotional disturbances presents an even greater challenge. Furthermore, recent literature does not specify recruitment procedures that may contribute to improving recruitment rates for future mental health service research (Dumka, Garza, Roosa & Stoerzinger, 1997). Finally, conducting quasi-experimental comparison studies adds another challenge as recruitment must also focus on achieving matching samples.

This presentation identifies critical issues and offers practical approaches to managing the recruitment process to meet evaluation and research goals for a comparison study. The following general questions are examined:

- What are the practical issues that may affect recruitment in community-based comparison studies?
- How can a quasi-experimental comparison study design be executed to achieve matched comparison samples and adequate sample size?

Method

The data for this presentation come from the Longitudinal Comparison Studies of the national evaluation funded by the Center for Mental Health Services (CMHS) as part of the Comprehensive Community Mental Health Services for Children and Their Families Program. The program funds interventions following the system of care philosophy, which calls for a broad array of services and supports, treatment in the least restrictive setting, family involvement in all aspects of planning and delivery of services, service coordination among all involved agencies and programs, and cultural competence. CMHS has funded three phases of such communities since 1993, from which a subset have been selected to participate in the comparison studies. In each case, system-of-care communities were matched with non-CMHS-funded communities that used a more traditional approach to serving children with emotional and behavioral problems. The longitudinal comparison studies attempt to determine whether systems of care lead to better outcomes for children and families than are found in traditional service systems.

Results and Discussion

The research team focused on two areas in managing the recruitment process: 1) community selection into the comparison studies, and 2) child selection into each community sample.

Community Selection

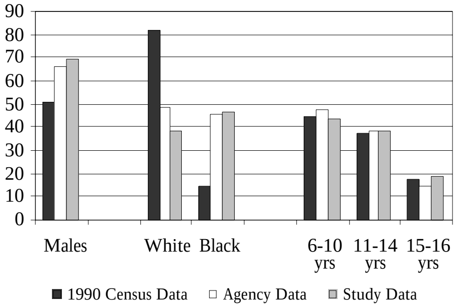
The first critical step in recruiting matched samples for the comparison studies is the selection of comparable communities. Selecting communities with different demographic characteristics will likely cause problems in the ensuing child and family recruitment process. Therefore, when selecting communities, researchers took preliminary steps to collect critical information both at the community- and child-level. During the community selection stage, researchers collected data addressing the following questions:

- How are the children referred to the service delivery system?
- How are the children with serious emotional disturbance defined?
- What type of demographic information is available through local agencies?
- Which agencies are involved in making referrals to mental health?
- Who are the lead contacts and who are responsible for intake?
- How is eligibility information stored and how can it be retrieved?
- What can the researchers provide the site in return?

All Phase I and Phase II comparison study communities were selected based on the following criteria: 1) service delivery approach; 2) geographic, demographic, and economic characteristics; 3) rate of child enrollment; and 4) child referral patterns.

Of these four matching criteria, selecting communities that yielded child and family samples with similar geographic, demographic, and economic characteristics based on the 1990 Census data was the most challenging criterion to meet in Phase I. Child demographic characteristics from one community in the Phase I comparison study are displayed in Figure 1. Census data from 1990, provider data on its service population, and the eventual sample data from the comparison study are compared. While census data adequately reflected the age of children with severe behavioral and emotional disorders, gender and race/ethnicity were found to be more difficult to match. The provider from the community in Figure 1 disproportionately served males and African-American children in relation to the overall county population. Statistics show demographic data describing the provider's overall service population to be a better predictor of the sample characteristics.

Figure 1
Comparison of Data Sources for Selecting Matching Communities



Child Selection

Once the community/provider selection process is complete, the child selection process must be established to recruit matching samples of children and families. In the system-of-care communities and according to the CMHS grant guidelines, children enrolled into services have serious emotional problems. Thus, all children receiving services in the system-of-care communities were eligible for the study. In the comparison communities, no such formal guidelines regarding severity of problems existed. As a result, children in these communities were screened through an eligibility process using the following criteria:

Clinical status as measured by the presence of a DSM-IV diagnosis of a mental health disorder and a clinical or functional assessment score above the clinical range on the following instruments: Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1991); Child and Adolescent Functional Assessment Scale (CAFAS; Hodges& Wong, 1996); or Global Assessment of Functioning (GAF; American Psychiatric Association, 1994).

- History of services received from multiple child-serving agencies (juvenile justice, education, child protective services, substance abuse, etc.)
- Currently at risk of, or past history of, out-of-home placement
- Participation in a special education program for children with serious emotional disturbances

Examining baseline CBCL scores measuring the level of child symptomatology revealed that using strict child selection criteria can yield samples with similar levels of mental health problems. In one pair of Phase I matched communities, children's CBCL Total Problem T-scores were insignificantly different at 68.9 and 70.2. Examining subgroups of children also revealed no differences (males: 68.7 vs. 70.6; 12-17 year olds: 69.5 vs. 70.1, and; Caucasians: 69.4 vs. 68.8). However, child selection criteria did not always yield samples with similar levels of functioning as measured by the CAFAS. In the same pair of matched communities, children had an average total CAFAS score of 78.1 vs. 70.7 ($t = 3.08$, $df = 440$, $p < .01$).

To more strictly manage the child selection process, an equivalent sample selection process was used in the Phase II comparison studies. The evaluation team initiated the process to monitor demographic and impairment level data to ensure that a matched sample of children were enrolled in the comparison pairs. Data from the comparison pairs were reviewed monthly to ensure similar children were being enrolled at both the comparison and system-of-care sites. If necessary, research staff adjusted the types of children being selected at intake to ensure a matched study sample without affecting children's enrollment into services.

Practical Recruitment Strategies

Strategies were also necessary to address the implementation of the recruitment process. Because the evaluation relies on agency staff to recruit children and families into the study, positive relations with agency staff are crucial to steady recruitment. In addition, the recruitment process should be efficient, family-friendly, and culturally sensitive to make the process quick and clear for staff and families alike. The design of the evaluation as it is described to families at the recruitment stage can also affect their decision to participate. A cumbersome and inaccessible evaluation design can discourage families from participating. The following techniques were used in the comparison studies to address these issues:

- Establish lead agency staff buy-in immediately
- Maintain frequent communication with recruiting sources
- Provide data feedback to agency staff and families to continue buy-in with the study
- Address conflict with demands on staff time vs. research needs
- Provide clear brochures, consent forms, and other study documentation for staff and families
- Conduct evaluation interviews at home or other convenient locations for families
- Provide monetary incentives for family participation

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System of Care Practice Review Scores as Predictors of Behavioral Symptomatology

Robert L. Stephens
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Mario Hernandez

Introduction

Previous evaluations of the impact that the system-of-care (SOC) approach has had on mental health service delivery for children with serious emotional disturbance have focused primarily on evaluating symptom and impairment outcomes for children and families and the services and costs associated with obtaining these outcomes (Bickman et al., 1995; Bickman, Summerfelt, & Noser, 1997; Lambert, Brannan, Breda, Heflinger, & Bickman, 1998). Little attention has been given to practice-level factors that may influence the impact that systems of care have on children and families. The longitudinal comparison study of the national evaluation of the Comprehensive Community Mental Health Services for Children and Their Families program (CCMHS) was designed to assess factors in service delivery systems and communities that may shape the overall impact of systems of care. The CCMHS program is sponsored by the Center for Mental Health Services (CMHS) of the Substance Abuse and Mental Health Services Administration (SAMHSA).

An understanding of the relationship between changes at the level of the service delivery system and outcomes for children and families can only be derived by exploring contextual factors in the community and in the practices of service providers. The System-of-Care Practice Review (SOCPR; Hernandez et al., 2001) was included in the longitudinal comparison study to assess these contextual factors. The SOCPR was designed to assess the service experiences of children and families during the provision of care in CMHS-funded communities and matched comparison communities without CMHS funding.

A direct assessment of service experiences at the practice level was needed to determine whether system-of-care principles were being expressed directly in the interactions between service delivery personnel and families. While system-of-care principles may be fully expressed at the level of the community or within a specific agency, incomplete diffusion of these principles into the practices of service providers will limit the effectiveness of these system changes. Conversely, in communities without a CMHS-funded system of care, system-of-care principles may be incorporated into the practices of individual service providers, but may not be operating in the community overall or in the administration of a specific agency. The current study was designed to assess the extent to which the experience of the principles of a system of care in interactions with service providers is predictive of clinical symptom outcomes for children being served in CMHS-funded system-of-care and matched comparison communities.

Methods

The SOCPR data collection efforts were conducted by staff at the Louis de la Parte Florida Mental Health Institute of the University of South Florida. The SOCPR used a case study approach to evaluate service experiences. The case study's unique strength lies in its ability to draw evidence from a variety of sources including documents, artifacts, interviews, and observations (Yin, 1990). The case study approach provides a potentially strong method for learning more about service delivery within a community context from the perspectives of families and their providers because of the quantity of information available and the opportunities for validation from multiple data sources (Hernandez et al., 2001). See Hernandez et al. (2001) for a detailed description of the development and application of the SOCPR within the comparison study.

Participants

Children and families were selected for participation in the SOCPR from samples of children and families being served in systems of care (SOC) and the matched comparison (non-SOC) communities that were participating in the longitudinal comparison study. The sample for these analyses was the group of children and families who were selected for participation in the SOCPR in the longitudinal comparison study and who had complete data for both CBCL Total Problems and SOCPR Total scores (N = 75). The number of children in the SOC and non-SOC groups, their associated demographic characteristics, and p-values for statistical tests of the differences between the two groups are presented in Table 1.

Table 1
Demographic Characteristics of Children in Each Sample, and Significance of Differences Between Samples

	SOC (N = 46)	*Non-SOC (N = 50)*	*Significance*
Sex			
Male	54.3%	64.0%	n.s.
Female	45.7%	36.0%	
Age			
6-8 y.o.	39.1%	28.0%	n.s.
9-11 y.o.	23.9%	16.0%	
12-14 y.o.	32.6%	32.0%	
15-17 y.o.	10.8%	24.0%	
Race			
Black	26.1%	50.0%	$p < 0.001$
White	67.4%	30.0%	
Hispanic	0.0%	0.0%	
Mixed	0.0%	14.0%	
Other	6.5%	6.0%	
Family Income			
<$15,000	51.1%	64.0%	n.s.
>= $15,000	48.9%	36.0%	

Instruments and procedures

The SOCPR protocol for each family consisted of multiple data collection components including document review, primary caregiver interview, child interview, formal provider interviews and informal helper interviews. Summary scores (1 = strongly disagree to 7 = strongly agree) were generated for the following four domains and their underlying subdomains: 1) *Child Centered and Family Focused* - Individualized, Full Participants, Case Management; 2) *Community Based* - Early Intervention, Access to Services, Level of Restrictiveness, Integration and Coordination; 3) *Cultural Competence* - Sensitivity and Responsiveness, Awareness, Agency Culture, Informal Supports; 4) *Impact* - Improvement, Appropriateness of Services. Finally, a Total score was calculated. In addition, as part of the data collection for the longitudinal comparison study, caregivers participated in face-to-face interviews that included a number of clinical, functional and family outcomes measures that were completed at the time of the child's entry into services and every six months thereafter for up to 36 months. The Child Behavior Checklist (CBCL; Achenbach, 1991) was selected from the set of outcomes as the focus for the current study. The CBCL was scored to obtain raw scores for the Total Problems, Internalizing and Externalizing scales, as well as eight subscales.

Results and Discussion

Table 2 contains descriptive statistics for the SOCPR Total scores and the CBCL Total Problems raw scores for both samples. Mean SOCPR Total score was significantly higher in the SOC than the non-SOC, as expected. Children in both groups had mean CBCL Total Problems scores within the clinical range at baseline. The mean for non-SOC children at the 12-month follow-up was still within the clinical range while the mean for SOC children dropped below the clinical cutoff.

Correlations between the SOCPR Total score and the CBCL Total Problems raw score were calculated at each of the three data collection waves. The only significant correlation was between the SOCPR Total score and the CBCL Total Problems score at the 12-month follow-up for the non-SOC group (r = -0.48, $p < 0.001$). This indicated that the experience of high levels of system-of-care principles in services was associated with lower symptom scores one year after entry into services. To explore the nature of this relationship further, a series of multiple regression analyses were conducted

Table 2
SOCPR Total Scores and CBCL Total Problems Scores

	SOC (N = 46)			*Non-SOC (N = 50)*		
	Mean	*SD*	*Range*	*Mean*	*SD*	*Range*
SOCPR						
Total Score	5.92	.71	4.29-6.94	4.47	.96	2.56-6.09
Baseline CBCL						
Total Problems raw score	64.54	27.43	10-151	72.86	32.92	5-135
Total Problems T-score	68.39	9.04	41-90	70.28	10.86	37- 88
12-month CBCL						
Total Problems raw score	46.50	26.05	0-111	57.11	37.59	0-155
Total Problems T-score	61.25	11.62	23- 82	63.55	15.73	23- 89

using the CBCL Total Problems raw score at 12 months as the dependent variable and using forced entry of predictors in the following order: 1) the baseline CBCL Total Problems score, 2) race/ethnicity dummy coded 1 for White and 0 for all other categories, 3) site dummy coded 1 for SOC and -1 for non-SOC, 4) SOCPR Total score, and 5) the interaction between site and the SOCPR Total score. The results are summarized in Table 3. As expected, baseline clinical symptom scores were predictive of symptom scores at the 12-month follow-up. The only other significant predictors of CBCL Total Problems at 12 months were the SOCPR Total score and the Site x SOCPR Total score interaction.

Table 3
Summary of Regression Analyses

Variables in Model		*Coefficient*	*Significance*
Model 1	Intercept	0.106	n.s.
	Baseline CBCL Total Problems	0.761	$p < 0.001$
Model 2	Intercept	1.546	n.s.
	Baseline CBCL Total Problems	0.783	$p < 0.001$
	Race	-7.164	n.s.
Model 3	Intercept	1.843	n.s.
	Baseline CBCL Total Problems	0.769	$p <$
	Race	-5.738	n.s.
	Site	-1.757	n.s.
Model 4	Intercept	47.791	$p < 0.02$
	Baseline CBCL Total Problems	0.743	$p < 0.001$
	Race	-5.392	n.s.
	Site	4.333	n.s.
	SOCPR Total Score	-8.579	$p < 0.015$
Model 5	Intercept	35.371	n.s.
	Baseline CBCL Total Problems	0.685	$p < 0.001$
	Race	-2.510	n.s.
	Site	-39.621	$p < 0.05$
	SOCPR Total Score	-6.704	$p < 0.05$
	Site x SOCPR Total	8.018	$p < 0.025$

Children and families in systems of care reported experiencing high levels of SOC principles in the services they received. Their services experiences were more consistent, and their experiences did not vary as a function of symptom severity. In contrast, children and families in matched comparison (non-SOC) communities reported more variability in their experiences of system-of-care principles in the services they received, and their experiences varied as a function of symptom severity. The results of this study underscore the importance of measuring services experiences at the practice level. There is a need to replicate these findings with a larger sample size to allow for analysis of individual change parameters over time using more sophisticated analysis strategies like hierarchical linear modeling to predict rates of change over time, as opposed to predicting the status of change as in the present study. The SOCPR has been foundational in establishing a metric for the experience of system-of-care principles in services received. Future work that refines the SOCPR to reduce the time and labor necessary for assessing these critical elements of the service delivery experience is highly recommended.

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Clinical and Functional Outcomes in the Comparison Study

E. Wayne Holden
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Tim Connor

Introduction

The longitudinal comparison study is a significant aspect of the National Evaluation of the Comprehensive Community Mental Health Services for Children and Their Families Program. This study is designed to address the question of differential effectiveness of systems of care. The study attempts to address this question by comparing the outcomes of children and families served by Center for Mental Health Services (CMHS)-funded systems of care with the outcomes of those served by other types of service systems. Three CMHS-funded communities were selected in the summer of 1997 to participate in this study and were matched with three communities that had not received CMHS funding.

Over the course of the last several years, a multi-method approach has been employed to evaluate outcomes, system characteristics, services delivered, and family service experiences across these six communities. Over 1,000 families have participated in this study with outcomes data collection completed recently and with services/costs data collection still underway. Results from the data collected will contribute to determining whether systems of care lead to better outcomes for children and families than are found in traditional service systems, and will begin to link system-level factors with practice-level factors. This paper provides an overview of initial, preliminary analyses of outcomes and services and costs data from the comparison study.

Methods

Sites and Participants

The systems of care and matched communities included: 1) Stark County matched with Mahoning County, Ohio; 2) Santa Cruz, CA matched with Travis County, TX; and 3) East Baltimore matched with West Baltimore, MD. The mean age of the 1,035 children recruited into the study was 11.8 years (*SD* = 6.2) with 56% of the sample between ages 9 and 14 at study entry. Approximately two-thirds of the sample were males and racial/ethnic status was distributed as follows: 43% African-American, 36% Caucasian, 11% Hispanic and 8% Mixed Race. Approximately 80% of the families reported annual incomes below $25,000.

Procedures and Instruments

Interviews were conducted with caregivers and children at entry into services and every six months thereafter up to 24 months post services entry. Included among the battery of outcome measures were the Child Behavior Checklist (CBCL; Achenbach, 1991), a caregiver report questionnaire assessing educational placements and child functioning within the educational system (Macro International, 1997) and a measure of youth-perceived social support (Macro International, 1997). Services and costs data were also collected from multiple management information systems in each community. Analyses conducted for this paper focused on data obtained from mental health and juvenile justice management information systems in the pair of sites located in Ohio.

Results

These preliminary data analyses were limited to the paired sites of Stark County (*n* = 218) and Mahoning County (*n* = 232) because they had the highest data completion rates and overall study retention rates. Outcome analyses focused on the CBCL, on functional indicators within the educational system, and on data obtained from mental health and juvenile justice management information systems. Linear growth curve modeling was used to evaluate change across time controlling for initial differences at entry into services between the two sites.

An analysis of the externalizing raw score from the CBCL identified significant linear ($p < .007$) and quadratic ($p < .004$) trends. Reduction of symptoms across time occurred at a steeper rate for the Stark County sample than the Mahoning County sample, although the level of symptoms was essentially equivalent at 24 months. Subsequent analyses revealed that the same pattern was displayed for the delinquency scale raw score, but not for the aggressive behavior raw score on the CBCL. For functional indicators, a significant linear decrease ($p < .007$) in use of special education services from 40% to 25% of the sample was displayed for the Stark County sample. Females showed a greater decrease in Stark County (from 24% to 6%) than females in Mahoning County (from 17% to 19%). On a related note, females in Stark County showed the greatest improvement in rates of school suspensions (a reduction from 32% to 7%). Prosocial peer support increased overall in Stark County following a quadratic trend ($p < .001$).

Nearly 80% of children in Mahoning County with a history of two or more juvenile justice incidents prior to entering services continued to display chronic juvenile justice involvement post services entry, while only 35% of a similarly defined group in Stark County displayed chronic juvenile justice involvement post services entry ($p < .002$). An analysis of combined mental health and juvenile justice costs indicated greater initial costs during the early months of services for children being served in Stark County with decreased costs in later months. The opposite pattern was displayed for children in Mahoning County with lower initial costs during the early months of services, which escalated during the later months of care.

Discussion

These initial preliminary results are encouraging and suggest a different pattern of parent-reported symptom change between Stark and Mahoning counties that may reflect different patterns in functional outcomes displayed in the educational and juvenile justice systems. This pattern of results was detected despite the absence of differences in overall parent rated behavioral and emotional symptom levels at 24 months. Functional outcomes and changes in the community that impact on service provision may ultimately be more directly related to long-term success for families participating in systems of care. More comprehensive and definitive analyses from the comparison study in the future will help to further elucidate these issues.

References

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