Factors Influencing Mental Health Service Utilization by Children with Serious Emotional and Behavioral Disturbance: Results from the LAMS Study

Amy N. Mendenhall, Ph.D., M.S.W.[1], **Christine Demeter, MA**[2], **Robert L. Findling, M.D.**[2], **Thomas W. Frazier, Ph.D.**[3], **Mary A. Fristad, Ph.D., ABPP**[4], **Eric A. Youngstrom, Ph.D.**[5], **L. Eugene Arnold, M.D.**[4], **Boris Birmaher, M.D.**[6], **Mary Kay Gill, MSN**[6], **David Axelson, M.D.**[6], **Robert A. Kowatch, M.D., Ph.D.**[7], and **Sarah McCue Horwitz, Ph.D.**[8]

[1]School of Social Welfare, University of Kansas, Lawrence, KS

[2]Department of Psychiatry, Division of Child and Adolescent Psychiatry, Case Western Reserve University, Cleveland, OH

[3]Center for Pediatric Behavioral Health and Center for Autism, Cleveland Clinic, Cleveland, OH

[4]Department of Psychiatry, Division of Child and Adolescent Psychiatry, Ohio State University, Columbus, OH

[5]Department of Psychology, University of North Carolina at Chapel Hill, Chapel Hill, NC

[6]Department of Psychiatry, Western Psychiatric Institute and Clinic, University of Pittsburgh Medical Center, University of Pittsburgh, Pittsburgh, PA

[7]Division of Psychiatry, Cincinnati Children's Hospital Medical Center, Cincinnati, OH

[8]Department of Pediatrics and Stanford Health Policy, Stanford University School of Medicine, Stanford, CA

Abstract

Objective—To describe service utilization of a cohort of children with emotional and behavioral disorders who visited outpatient mental health clinics in four Midwest cities.

Method—Data come from the Longitudinal Assessment of Manic Symptoms (LAMS) Study. 707 youth (ages 6–12 years) and their parents completed diagnostic assessments, demographic information and an assessment of mental health service utilization. Analyses examined the relationship of demographics, diagnoses, impairment, and comorbidity to the type and level of services utilized.

Results—Service utilization is multimodal with half of the youth receiving both outpatient and school services during their lifetime. Non-need factors including age, sex, race, and insurance, were related to types of services used. Youth diagnosed with a bipolar spectrum disorder had higher utilization of inpatient services and two or more services at one time compared to youth diagnosed with depressive or disruptive disorders. More than half of youth diagnosed with bipolar or depressive disorders had received both medication and therapy during their lifetime whereas for youth diagnosed with a disruptive disorder therapy only was more common. Impairment and comorbidity were not related to service utilization.

Corresponding Author: Sarah McCue Horwitz, PhD, Professor, Department of Pediatrics and Stanford Health Policy, Stanford University School of Medicine, 117 Encina Commons, Stanford, CA 94305-6019; 650/724-5924 [Telephone]; 650/723-1919 [Fax]; sarah.horwitz@stanford.edu.

Conclusions—Use of mental health services for children begins at a very young age and occurs in multiple service sectors. Type of service use is related to insurance and race/ethnicity, underscoring the need for research on treatment disparities. Contrary to findings from results based on administrative data, medication alone was infrequent. However, the reasonably low use of combination therapy suggests that clinicians and families need to be educated on the effectiveness of multimodal treatment.

Keywords

Bipolar Disorder; Mania; Child; Adolescent; Services

An estimated 2.7 million children in the United States suffer from severe mental illness and mental illness causes significant impairment in 3% to 18% of children and adolescents (1–2). However, data from community-based studies document that children with impairing mental illnesses receive no services or only services in the educational system (3–4). When youth interact with multiple service sectors these sectors frequently do not work together to form a comprehensive treatment approach, and services are often inadequate to address symptoms and impairment (5–6).

Little information exists about utilization and barriers specific to individual diagnoses, although data suggest that having a disruptive disorder is significantly associated with children's use of mental health services, but having a depressive disorder is not (7–8). Few studies have investigated service utilization of children diagnosed with more serious disorders such as bipolar disorder and psychosis. Examination of MEDSTAT's MarketScan data for 1993 and 1996 found that youth receipt of mental health services fell from 4.2% to 3.0% (9). Frequency of specific diagnoses differed by service setting. Major depression/ bipolar, other mental health diagnoses, and mild/moderate depression were most common in inpatient settings while hyperactivity, other mental health diagnoses, and adjustment reaction disorder were most common in outpatient settings. Similar analyses of MarketScan data from 1997 to 2000 found that the overall distribution of diagnoses changed little from 1997 to 2000 for hyperactivity, depressive disorders, adjustment disorders and other mental health disorders but significantly increased for bipolar disorders, schizophrenia, and anxiety disorders (10).

Despite its low prevalence, bipolar disorder is associated with a disproportionate use of health services and significantly higher costs driven by more use of inpatient hospitalization (11). A study examining individuals with insurance claims in 1996 found nearly half (40%) of the adolescents diagnosed with bipolar disorder had at least one inpatient hospitalization within the year. Half of those (20%) had more than one inpatient hospitalization within the year. Almost 25% of those < 21 years exceeded 20 outpatient visits, and almost 50% of the hospitalized adolescents exceeded 30 inpatient days (12). Similarly, in the Course and Outcome of Bipolar Illness in Youth (COBY) study, approximately 80% of the youth diagnosed with bipolar disorder used services over a six month period. Sixty seven percent used outpatient services, 22%, inpatient/partial hospitalization services, and 12%, residential/therapeutic school-based services. Predictors of high levels of care included older age, female sex, greater symptom severity, and rapid cycling. Predictors of more restrictive treatment settings included suicidal and self-injurious behavior, comorbid conduct disorder, and parental substance use disorders (13).

These studies suggest mental health service utilization patterns differ in important ways by diagnosis, and specific attention needs to be focused on the most severe disorders, both because of the paucity of information but also because these youth use the majority of services, particularly costly services such as hospitalization (11–12).

The purpose of the current study is to describe service utilization by demographics and diagnoses for a cohort of children with emotional and behavioral disorders who were first time users of participating outpatient mental health clinics in four major Midwest cities. The current analyses contribute to the scant literature on children's mental health service utilization by: (1) focusing on service use by a unique outpatient clinic population; (2) examining various types of services at all levels of care; and (3) exploring patterns of service utilization in the context of diagnosis. Specifically, we tested the hypothesis: Demographic characteristics (sex [male], age [older], race [White] and insurance coverage [private insurance]) and clinical characteristics (major mental illness, comorbid diagnoses, more impairment) will be related to utilization of more services and higher intensity services.

Method

Sample

The source population consisted of all children between 6 years and 12 years 11 months on their first visit to child outpatient clinics associated with the four LAMS university partners (one child turned 13 between the screening and baseline assessment). Parents or guardians accompanying eligible children were approached using procedures approved by each university's and/or hospital's Institutional Review Board. After consenting, the adults were asked to complete the Parent General Behavior Inventory-10 Item Mania Scale (PGBI-10M), in addition to sociodemographic questions (14). Of 3329 study families visiting the participating outpatient clinics, 2622 (79%) agreed to be screened. Results indicated nearly half 1124 (43%) scored above the *a priori* cut-off for manic symptoms (positive for ESM or ESM+). Of those with ESM+, 1111 were eligible for the longitudinal follow-up portion of the study (13 were ineligible due to parent report of a diagnosis of Autism/PDD, IQ <70) and of these, 621 parent/child dyads agreed to participate.

For every 10 ESM+ children, one ESM− child was selected as a potential comparator. Using minimization methods, controls were selected to match the "modal" positive child in the time segment (15). Eighty-six ESM− parent/child dyads agreed to participate. The design and sample selection as well as sociodemographic data on all children screened have been previously described (16). Families who agreed to participate in the longitudinal portion of the study were scheduled for a baseline interview, the clinical highlights of which are described elsewhere (17).

Measures

Demographics—Demographics including child age, sex, race, ethnicity, and insurance status were collected as well as family demographic information such as family composition, socio-economic status, and parents' education and employment.

Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Episode supplemented with additional mood onset and offset items (K-SADS-PL-W)—To assess for current and past psychiatric disorders, children and their guardians were administered the Schedule for Affective Disorders and Schizophrenia for School Age Children- Present and Lifetime episode (KSADS-PL) supplemented with additional mood onset and offset items from the WASH-U-K-SADS (18–19). Additionally, DSM-IV items screening for pervasive developmental disorders (PDDs) were added. Diagnoses were grouped into hierarchical categories: bipolar spectrum disorder, depressive disorder, psychotic disorder, anxiety disorder, disruptive behavior disorders, pervasive developmental disorders, other, and no diagnosis. The hierarchical order was designed to provide clarity about the status and evolution on the

mood spectrum, which is the main area of investigation in the LAMS study. Children with comorbidities were only counted in the diagnostic category highest in the hierarchy.

Children's Global Assessment Scale (CGAS)—The CGAS documents children's overall level of functioning at home, school, and with peers (20). Scores range from 1 to 100 with lower scores indicating more significant impairment. Interviewers completed ratings for the child's current functioning (past two weeks) and for the most severe past episode of psychiatric illness. Children were divided into two impairment groups; those with a CGAS score less than 51 (indicative of major impairment) and those with CGAS scores greater than or equal to 51 (mild impairment).

Services Assessment of Children and Adolescents (SACA)—The parent version of the SACA gathers information about the use of various mental health services for the child in three broad domains: inpatient, outpatient, and school. The SACA was used at the baseline assessment to collect information on lifetime and current service utilization from parent report (21).

Analyses

Descriptive statistics, including means and percentages, described the demographic, clinical, and service variables. Chi-square analyses evaluated associations among categorical variables (or Fisher's exact test when cells showed low expected frequencies). Logistic regression analyses evaluated the relationships of demographic characteristics to lifetime hospitalization and utilization of specific treatments at baseline. Analyses were conducted with SAS version 9.2.

Results

Sample Characteristics

The sample has been previously described (16–17). Briefly, two-thirds of the sample is male (n=478, 68%) and White (n=455, 64%) with nearly half (n= 323, 45%) between the ages of six and eight. Fifty-two percent had public insurance and 23% of the children had a primary diagnosis within the bipolar spectrum. Sixty-three percent of the children had mild to moderate functional impairment and 72% had taken psychotropic medications during their lifetime.

Service Utilization

Over 11% of the sample reported lifetime use of intensive services (n=80; Table 1), most commonly inpatient hospitalization (n=64, 9%). Ninety-eight percent had used outpatient services with 58% (n=411) having consulted with a psychiatrist. School services (n=361, 51%) were most often special help in the regular classroom or counseling. Almost 50% of the sample had received both outpatient and school mental health services. The mean ages at which children began outpatient (M=6.3, SD=2.6) and alternative services (M=6.1, SD=2.8) were lower than intensive (M= 7.4, SD= 2.3) and school services (M=7.0, SD=2.1).

Demographic/ Clinical Variables and Service Utilization

Bivariate analyses (Table 2) indicated that youth who were older, had lower CGAS scores and more than one diagnosis were more likely to be hospitalized. Older youth (i.e., aged 11–13) had more lifetime inpatient admissions and also had significantly more admissions in the last year. A higher percentage of older youth (n=32; 18%) had utilized both intensive and outpatient services during their lifetime compared to youth ages 6 to 8 (n=25, 8%) or 9 to 10 (n=21).

For outpatient services, results indicated that youth were more likely to have had only therapy in their lifetime if they were non-white, female, younger and insured by Medicaid (Table 2). Analyses also indicated that youth were more likely to be receiving only medications at baseline if they were male and were higher functioning according to the CGAS. White children were more likely to have received both medications and therapy sometime in their life compared to other races as were older children and children not insured through Medicaid (χ^2=14.02, p<.001). Children insured through Medicaid (n=88, 24%) were less likely to be utilizing two or more services compared to children with other coverage (n=113, 33.5%).

Multivariate results (Table 3) indicated that, controlling for other demographic and clinical variables and consistent with the bivariate results, older children with lower CGAS scores were more likely to have ever been hospitalized. For treatment, receiving only therapy was related to being non-White, female, younger and insured by Medicaid while receiving only medication was more common if children were male (borderline) and had higher CGAS scores. Lifetime use of combination therapy was more common for older children, those not insured through Medicaid and those with lower CGAS scores.

Diagnosis and Impairment Associations with Service Utilization

Across diagnostic categories, children diagnosed with bipolar spectrum disorder had the highest rates of lifetime inpatient admissions (n=36, 22%) and admissions in the past year (n=22, 14%) (Table 4). Across diagnostic categories, neither presence of comorbidity nor current level of functioning were significant factors for whether youth had lifetime or past year inpatient hospitalizations.

For outpatient services, in both the bipolar spectrum group and the depressive disorder group, more than half of the youth in each group had received both medication and therapy during their lifetime (bipolar: n=90, 57%; depressive: n=68, 55%). However among children in the disruptive behavior disorder group, more children had received therapy only (n=82, 40%) than both medication and therapy (n=75, 36%). Comorbidity and impairment did not impact lifetime exposure to different outpatient treatments with one exception. Children in the bipolar spectrum group with lower CGAS scores were more likely to have had only medication compared to those with higher scores. Also, youth with bipolar spectrum disorder and major functional impairment (n=32, 41%) were more likely to be utilizing at least two services than youth with bipolar spectrum disorder and mild impairment (n=21, 26%).

Characteristics and Benefits of Treatment as reported by parents?

Of those children who had at least one lifetime inpatient hospitalization (n=65, 9%), the mean number of hospitalizations was 2.3 (SD=3.1) (Table 5). Median length of stay for the most recent inpatient hospitalization was five days and the most frequently reported type of treatment was therapy only (n= 18, 28%) although many parents were unsure of treatments received (n= 20, 31%) or did not report any treatment (n= 11, 17%). Parents of children receiving medication only never reported their child benefited "a lot" from the treatment, and only 57% (n=4) reported their child benefited "some."Most of the parents of children receiving therapy only or both medication and therapy reported their child benefited "some" or "a lot" from the treatment (therapy only: n= 17, 94%; combination: n= 8, 89%).

For current outpatient treatment, children were seeing, on average, 1.2 professionals (SD=0.8) and most often were receiving therapy only. Most parents of children receiving medication only or both medication and therapy reported their child benefited "some" or "a

lot" from the treatment (medication only: n=156, 83%, combination: n=92, 84%). Fewer parents reported their child benefited "some" or "a lot" from therapy only (n= 165, 66%).

Discussion

Similar to previous findings, children most frequently utilized mental health services through school and outpatient settings. Almost half of the youth had received both outpatient and school services during their lifetime (3, 22).

Lower current levels of functioning and older age increased the likelihood that youth had inpatient admissions, consistent with previous findings (13, 23). Even though the current sample only included children ages 6 to 13, whereas other studies included adolescents, older age increased the likelihood of hospitalization. As duration of illness continues intensity of intervention often increases, more often leading to hospitalization. As hypothesized, race was a significant factor in service utilization. Similar to past findings (24), White children were more likely to have received both medication and therapy in their lifetime whereas children from other racial groups were more likely to have only received therapy- Children with Medicaid coverage were less likely to have received combination treatment and more likely to have received therapy only compared to children with other insurance coverage. Additionally, these children were less likely to be utilizing two or more services than children with other coverage. Low household income and restrictions in coverage may be preventing these youth from getting all needed services. Since Medicaid reimbursement is low for physicians and clinics can charge for the actual costs of counseling or therapy, therapy may be the first line intervention in this sample of children . Also, cultural differences in attitudes towards mental illness and the appropriateness of specific interventions may be influencing utilization patterns. Sex was not a significant factor in inpatient service utilization but was for outpatient service utilization, where females were more likely to be receiving therapy only and males were more likely to be receiving medication only. Of note, research findings on the impact of sex on service utilization have not been consistent (8, 23–24).

Youth diagnosed with a bipolar spectrum disorder had higher inpatient admissions in their lifetime and in the last year compared to those diagnosed with depressive or disruptive disorders. These results are consistent with past research, in which adolescents with pediatric bipolar disorder had higher hospital admission rates and injury/overdose-related medical visits compared to youth with other psychiatric disorders (11). In both the bipolar spectrum group and the depressive disorder group, more than half of the youth in each group had received both medication and therapy during their lifetime. However, among children in the disruptive behavior disorder group, more children had received therapy only than both medication and therapy. This finding suggests that clinicians are more likely to employ only psychosocial interventions for strictly behavioral disorders. For those children with uncomplicated oppositional defiant disorder and conduct disorder, this is consistent with current treatment guidelines although combination approaches might be optimal for some children with disruptive behavior disorders who do not respond to psychosocial interventions or children with specific co-occurring disorders such as children with ADHD and ODD/CD (25–28). For children with mood disorders, clinicians are more likely to pair psychosocial interventions with medication, as indicated by treatment guidelines (29–31).

Contrary to our hypothesis, comorbidity and impairment were not associated with service utilization in this sample. A possible explanation for this finding is that clinical need factors are more important for initial entry into the service system than for remaining in the system.

A more detailed investigation of characteristics of utilization of inpatient and outpatient services revealed that even though only 9% of the sample had inpatient hospitalizations in their lifetime, these youth tended to be hospitalized multiple times. Research suggests that 24% to 37% of youth will be readmitted to a psychiatric hospital within 1 year after discharge with age, sex, clinical and family characteristics all being factors associated with readmission (32). Interestingly, parents seemed to find therapy only and a combination of medication and therapy as most beneficial to their child in inpatient settings. However, in outpatient settings, parents rated medication only and a combination of medication and therapy as more beneficial than therapy only. These results do not provide reasons for parents' ratings; but possible explanations may include the frequent changes in medications in a short amount of time in inpatient settings, feeling more comfortable with their children receiving medications at home where parents can monitor, or unreasonably high expectations for improvement of complex diagnoses such as bipolar disorder with therapy only. More research needs to be conducted to determine how parents evaluate treatment success in various treatment settings. Finally, only 46% of the children in the study were receiving both outpatient medication and therapy at the time of the assessment even though parents of children in both inpatient and outpatient settings report the combination of medication and therapy as beneficial. Emerging practice guidelines and research suggest the combination of psychosocial intervention and medication is often the most effective option for treating serious mental illness in children and adolescents (27–31).

Limitations

The present study has several limitations. First, service utilization data were based on parent report, and were not verified by an additional source. Second, even in a large sample of outpatient utilizers, small cells sizes limited some comparisons. This sample was restricted to children who were first time users of the participating clinics thus likely to underestimate service utilization. Finally, these data are cross-sectional. Examination of the patterns, predictors and child outcomes of service use will require data from the longitudinal portion of the study currently in process.

Clinical Implications

Data from this sample of outpatient utilizers suggests that use of mental health services for children begins at a young age, is multimodal, and occurs in multiple service sectors. Thus the need for inter-service sector coordination is critical to optimize treatment effectiveness and efficiency. The finding that type of service use is related to non-need factors such as insurance and race/ethnicity suggests the continued need for research on treatment disparities. Contrary to the results from studies examining administrative data, we found children were infrequently receiving just medication (33, 34). However, efforts need to be made to ensure that clinicians and families are educated about all treatment options since less than 50% of children are receiving a combination of medication and therapy despite research findings indicating the effectiveness of combination treatment for many disorders. Finally, the increased likelihood for hospitalization as youth get older points to the importance of early mental health prevention and intervention efforts for younger children starting to exhibit symptoms of mental illness. Early mental health prevention and intervention efforts in both medical and educational settings, sectors where young children are commonly seen, may help to divert youth from restrictive treatment settings and to reach disadvantaged youth who are receiving suboptimal or no mental health treatment.

Acknowledgments

References

1. Federal Interagency Forum on Child and Family Statistics. America's Children: Key National Indicators of Well-Being, 2007. Washington, DC: U.S. Government Printing Office; 2007.

2. Costello EJ, Egger H, Angold A. 10-year research update review: The epidemiology of child and adolescent psychiatric disorders: I. Methods and public health burden. Journal of the American Academy of Child & Adolescent Psychiatry. 2005; 4:972–986. [PubMed: 16175102]

3. Leaf PJ, Alegria M, Cohen P, et al. Mental health service use in the community and schools: results from the four community MECA study. Journal of the American Academy of Child & Adolescent Psychiatry. 1996; 35:889–897. [PubMed: 8768348]

4. Burns BJ, Costello EJ, Angold A, et al. DataWatch: Children's mental health service use across service sectors. Health Affairs. 1995; 14:147–159. [PubMed: 7498888]

5. U.S. Department of Health and Human Services. Mental Health: A report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, Substance Abuse and Mental Services Administration, Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health; 1999.

6. Greenbaum, PE.; Dedrick, RF.; Friedman, RM., et al. National Adolescent and Child Treatment Study (NACTS): Outcomes for children with serious emotional and behavioral disturbance. In: Epstein, MH.; Kutash, K.; Duchnowski, A., editors. Outcomes for children and youth with emotional and behavioral disorders and their families: Programs and evaluation best practices. Austin, TX: PRO-ED; 1998.

7. Wu P, Hoven CW, Bird HR, et al. Depressive and disruptive disorders and mental health service utilization in children and adolescents. Journal of the American Academy of Child & Adolescent Psychiatry. 1999; 38:1081–1090. [PubMed: 10504806]

8. Wu P, Hoven CW, Cohen P, et al. Factors associated with use of mental health services for depression by children and adolescents. Psychiatric Services. 2001; 52:189–195. [PubMed: 11157117]

9. Leslie DL, Rosenheck RA, Horwitz SM. Patterns of mental health utilization and costs among children in a privately insured population. Health Services Research. 2001; 36:113–127. [PubMed: 11324739]

10. Martin A, Leslie D. Psychiatric inpatient, outpatient, and medication utilization and costs among privately insured youths, 1997–2000. American Journal of Psychiatry. 2003; 160:757–764. [PubMed: 12668366]

11. Peele PB, Axelson DA, Xu Y, et al. Use of medical and behavioral health services by adolescents with bipolar disorder. Psychiatric Services. 2004; 55:1392–1396. [PubMed: 15572567]

12. Peele PB, Xu Y, Kupfer DJ. Insurance expenditures on bipolar disorder: clinical and parity implications. American Journal of Psychiatry. 2003; 160:1286–1290. [PubMed: 12832243]

13. Rizzo CJ, Esposito-Smythers C, Swenson L, et al. Factors associated with mental health service utilization among bipolar youth. Bipolar Disorder. 2007; 9:839–850.

14. Youngstrom EA, Frazer TW, Demeter C, et al. Developing a 10-item Mania Scale from the Parent General Behavioral Inventory for Children and Adolescents. Journal of Clinical Psychiatry. 2008; 69:840–843. [PubMed: 18384247]

15. Scott NW, McPhereson GC, Ramsay CR, et al. The Method of minimization for allocation on clinical trials: A Review. Controlled Clinical Trials. 2002; 23:662–674. [PubMed: 12505244]

16. Horwitz SM, Demeter C, Ragano ME, et al. Identification of a childhood bipolar phenotype—the Longitudinal Assessment of Manic Symptoms (LAMS) study: Background, design and initial screening. Journal of Clinical Psychiatry. 2010; 71:1511–1517. [PubMed: 21034684]

17. Findling RL, Younstrom EA, Fristad MA, et al. Characteristics of Children with Elevated Symptoms of Mania: the Longitudinal Assessment of Manic Symptoms (LAMS) Study. Journal of Clinical Psychiatry. 2010; 71:1664–1672. [PubMed: 21034685]

18. Kaufman J, Birmaher B, Brent D, et al. Schedule for Affective Disorrders and Schizophrenia for School-Age Children- Present and lifetime version (K-SADS-PL): initial reliability and validity data. Journal of the American Academy of Child and Adolescent Psychiatry. 1997; 36:980–988. [PubMed: 9204677]

19. Geller B, Zimmerman B, Williams M, et al. Reliability of the Washington University in St. Louis Kiddie Schedule for Affective Disorders and Schizophrenia (WASH-U-KSADS) mania and rapid cycling sections. Journal of the American Academy of Child and Adolescent Psychiatry. 2001; 40:450–455. [PubMed: 11314571]

20. Shaffer D, Gould M, Brasic J, et al. A Children's Golbal Assessment Scale (CGAS). Archives of General Psychiatry. 1983; 40:1228–1231. [PubMed: 6639293]

21. Hoagwood K, Horwitz S, Stiffman A, et al. Concordance between parent reports of children's mental health services and service records: The Services Assessment for Children and Adolescents (SACA). Journal of Child and Family Studies. 2000; 9:315–331.

22. Farmer E, Stangl DK, Burns BJ, et al. Use persistence, and intensity: Patterns of care for children's mental health across one year. Community Mental Health Journal. 1999; 25:31–46. [PubMed: 10094508]

23. McDermott BM, McKelvery R, Roberts L, et al. Severity of children's psychopathology and impairments and its relationship to treatment setting. Psychiatric Services. 2002; 53:57–62. [PubMed: 11773650]

24. Cuffe SP, Waller JL, Cuccaro ML, et al. Race and gender differences in the treatment of psychiatric disorders in young adolescents. Journal of the American Academy of Child & Adolescent Psychiatry. 1995; 34:1536–1543. [PubMed: 8543522]

25. Eyberg SM, Nelson MM, Boggs SR. Evidence-based psychosocial treatments for children and adolescents with disruptive behavior. Journal of Clinical Child & Adolescent Psychology. 2008; 37(1):215–237. [PubMed: 18444059]

26. Jensen PS, Hinshaw SP, Kraemer HC, et al. Comparing comorbid subgroups. Journal of the American Academy of Child & Adolescent Psychiatry. 2001; 40:147–158. [PubMed: 11211363]

27. Kutcher S, Aman M, Brooks SJ, et al. International consensus statement on attention-deficit/hyperactivity disorder (ADHD) and disruptive behaviour disorders (DBDs): clinical implications and treatment practice suggestions. European Neuropsychopharmacology. 2004; 14:11–28. [PubMed: 14659983]

28. Bangs ME, Hazell P, Danckaerts M, et al. Atomoxetine for the treatment of attention-deficit/hyperactivity disorder and oppositional defiant disorder. Pediatrics. 2008; 121:e-314–e320. [PubMed: 18245404]

29. March J, Silva S, Petrycki S, et al. Fluoxetine, cognitive-behavioral therapy, and their combination for adolescents with depression: Treatment for Adolescents with Depression Study (TADS) randomized controlled trial. Journal of the American Medical Association. 2004; 292:807–820. [PubMed: 15315995]

30. McClellan J, Kowatch R, Findling RL, et al. Practice parameter for the assessment and treatment of children and adolescents with Bipolar Disorder. Journal of the American Academy of Child & Adolescent Psychiatry. 2007; 46:107–125. [PubMed: 17195735]

31. Pliszka S. the AACAP Work Group on Quality Issues. Practice parameter for the assessment and treatment of children and adolescents with Attention-Deficit/Hyperactivity Disorder. Journal of the American Academy of Child & Adolescent Psychiatry. 2007; 46:894–921. [PubMed: 17581453]

32. Fontanella CA. The influence of clinical, treatment, and healthcare system characteristics on psychiatric readmission of adolescents. American Journal of Orthopsychiatry. 2008; 78:187–198. [PubMed: 18954182]

33. dosReis S, Zito JM, Safer DJ, et al. Multiple psychotropic medication use for youths: a two-state comparison. Journal of Child and Adolescent Psychopharmacology. 2005; 15(1):68–77. [PubMed: 15741788]

34. Zito JM, Safer DJ. Recent child pharmacoepidemiological findings. Journal of Child and Adolescent Psychopharmacology. 2005; 15(1):5–9. [PubMed: 15741780]

Table 1

Lifetime Service Utilization by Modality & Mean Age Treatment Began

Treatment Modality	N (%)	Age Treatment Began (in years)
		Mean (SD)
Intensive Services	80 (11.3)	7.4 (2.3)
Residential placement/Partial hospitalization/Day treatment program	39 (5.5)	7.7 (2.1)
Inpatient hospitalization	64 (9.1)	7.7 (2.4)
Outpatient Services	689 (97.5)	6.3 (2.6)
Psychiatrist	411 (58.1)	7.9 (2.4)
Pediatrician or family doctor	403 (57.0)	5.8 (2.3)
Psychologist, social worker, counselor, therapist	572 (80.9)	7.1 (2.5)
Alternative Services	47 (6.6)	6.1 (2.8)
Religion-based treatment	25 (3.5)	5.8 (2.8)
Acupuncturist/Chiropractor	6 (0.8)	5.7 (2.3)
Self-help Groups/Respite Care	20 (2.8)	.03 (0.2)
School Services	361 (51.1)	7.0 (2.1)
Specialized school	49 (6.9)	7.0 (2.4)
Special classroom	102 (14.4)	6.8 (1.8)
Special help in regular classroom	171 (24.2)	6.7 (2.0)
Counseling/therapy at school	232 (32.8)	7.5 (2.0)
Received Intensive & Outpatient Services	78 (11.0)	5.4 (2.5)
Received Intensive & School Services	51 (7.2)	5.6 (2.2)
Received Outpatient & School Services	351 (49.6)	5.6 (2.2)

Table 2

Service Utilization by Demographic Variables

	Inpatient		Outpatient					
			Lifetime Exposure to Treatment types N (%)					
	Lifetime admissions N (%)	Admission in last year N (%)	Evaluation Only	Therapy Only	Medication Only	Medication and Therapy	Lifetime Intensive + Outpatient N (%)	Currently utilizing at least 2 services N (%)
Entire Sample	65 (9.2)	35 (5.0%)	45 (6.4)	208 (29.4)	109 (15.4)	326 (46.1)	78 (11.0%)	201 (28.4%)
Race:								
White (n=455)	43 (9.5)	26 (5.7)	27 (5.9)	113 (24.8)	74 (16.3)	226 (49.7)	49 (10.8)	139 (30.5)
Other Races (n=252)	22 (8.7)	9 (3.6)	18 (7.1)	95 (37.7)	35 (13.9)	100 (39.7)	29 (11.5)	62 (24.6)
	X^2= 0.101, p=0.751	X^2= 1.583, p=0.208	X^2= 0.326, p=0.568	X^2= 11.985, p<0.001	X^2= 0.871, p=0.351	X^2= 7.755, p=0.005	X^2= 0.049, p=0.825	X^2= 2.818, p=0.093
Ethnicity:								
Hispanic (n=31)	5 (16.1)	3 (9.7)	0 (0)	7 (22.6)	5 (16.1)	19 (61.3)	6 (19.4)	11 (35.5)
Non-Hispanic (n=676)	60 (8.9)	32 (4.7)	45 (6.7)	201 (29.7)	104 (15.4)	307 (45.4)	72 (10.7)	190 (28.1)
	Fisher's Exact Test, p= 0.172	Fisher's Exact Test, p= 0.194	Fisher's Exact Test, p= 0.254	X^2= 0.901, p=0.342	Fisher's Exact Test, p= 1.000	X^2= 2.518, p=0.113	Fisher's Exact Test, p= 0.149	X^2= 0.793, p=0.373
Sex:								
Male (n=478)	41 (8.6)	22 (4.6)	30 (6.3)	129 (27.0)	83 (17.4)	228 (47.7)	49 (10.3)	142 (29.7)
Female (n=229)	24 (10.5)	13 (5.7)	15 (6.6)	79 (34.5)	26 (11.4)	98 (42.8)	29 (12.7)	59 (25.8)
	X^2= 0.672, p=0.413	X^2= 0.380, p=0.538	X^2= 0.060, p=0.806	X^2= 5.457, p=0.019	X^2= 3.671, p=0.055	X^2= 0.756, p=0.385	X^2= 1.226, p=0.268	X^2= 1.183, p=0.277
Age Category:								
6–8 (n=323)	20 (6.2)	11 (3.4)	24 (7.4)	110 (34.1)	51 (15.8)	131 (40.6)	25 (7.7)	84 (26.0)
9–10 (n=210)	14 (6.7)	7 (3.3)	14 (6.7)	49 (23.3)	31 (14.8)	109 (51.9)	21 (10.0)	66 (31.4)
11–13 (n=174)	31 (17.8)	17 (9.8)	7 (4.0)	49 (16.7)	27 (15.5)	86 (49.4)	32 (18.4)	51 (29.3)
	X^2= 20.588, df=2 p<0.001	X^2= 11.395, df=2 p=0.003	X^2= 2.207, df=2 p=0.332	X^2= 6.837, df=2 p=0.033	X^2= 0.73, df=2 p=0.964	X^2= 8.529, df=2 p=0.014	X^2= 13.594, p<.001	X^2= 1.927, df=2, p=0.382
Insurance Status:								
Medicaid Only (n=370)	38 (10.3)	18 (4.9)	28 (7.6)	128 (34.6)	60 (16.2)	148 (40.0)	47 (12.7)	88 (23.8)
Other Insurance (n=337)	27 (8.0)	17 (5.0)	17 (5.0)	80 (23.7)	49 (14.5)	178 (52.8)	31 (9.2)	113 (33.5)
	X^2= 1.077, p=0.299	X^2= 0.012, p=0.912	X^2= 1.677, p=0.195	X^2= 8.915, p=0.003	X^2= 0.238, p=0.626	X^2= 14.018, p<0.001	X^2= 1.907, p=0.167	X^2= 8.235, p=0.004
CGAS Group:								

| | Inpatient | | Outpatient | | | | | | |
| | Lifetime admissions N (%) | Admission in last year N (%) | Lifetime Exposure to Treatment types N (%) | | | | Lifetime Intensive + Outpatient N (%) | Currently utilizing at least 2 services N (%) |
			Evaluation Only	Therapy Only	Medication Only	Medication and Therapy		
CGAS <51 (n=270)	35 (13.0)	16 (5.9)	18 (6.9)	78 (29.8)	32 (12.2)	134 (51.1)	41 (15.6)	93 (34.4)
CGAS 51 (n=433)	30 (6.9)	19 (4.4)	27 (6.4)	130 (30.7)	76 (18.0)	190 (44.9)	37 (8.7)	106 (24.5)
	$X^2 = 7.217, p=0.007$	$X^2 = 0.831, p=0.362$	$X^2 = 0.063, p=0.802$	$X^2 = 0.071, p=0.790$	$X^2 = 4.032, p=0.045$	$X^2 = 2.517, p=0.113$	$X^2 = 7.638, p=0.006$	$X^2 = 8.136, p=0.004$
Comorbid Diagnoses								
One current diagnosis (n=155)	8 (5.2)	7 (4.5)	12 (7.7)	51 (32.9)	23 (14.8)	69 (44.5)	11 (7.1)	33 (21.3)
More than one current diagnosis (n=533)	57 (10.7)	28 (5.3)	33 (6.2)	157 (29.5)	86 (16.1)	257 (48.2)	67 (12.6)	168 (31.5)
	$X^2 = 4.559, p=0.033$	$X^2 = 0.177, p=0.674$	$X^2 = 0.472, p=0.492$	$X^2 = 0.677, p=0.411$	$X^2 = 0.151, p=0.697$	$X^2 = 0.660, p=0.417$	$X^2 = 3.579, p=0.059$	$X^2 = 6.709, p=010$

Table 3

Multivariate Results examining factors associated with Lifetime Inpatient Utilization and Outpatient Treatments

Was the child ever hospitalized?			
Total Model	X^2=33.373, p<.001, R^2= 0.101		
Step 1	X^2=18.704, p=.001, R^2= 0.057		
	B	**Wald Chi-Square**	**p value**
White only race [*]	0.212	0.471	.493
Sex	0.199	0.497	.481
Age	0.285	16.040	<.001
Medicaid only insurance	−0.300	1.003	.317
Step 2	X^2= 14.669, p<.001, R^2=0.044		
CGAS score	−0.042	9.465	.002
More than one current diagnosis	0.495	1.455	.228

Did the participant receive therapy only in their lifetime?			
Total Model	X^2=29.002, p<.001, R^2= 0.059		
Step 1	X^2=26.192, p<.001, R^2= 0.053		
	B	**Wald Chi-Square**	**p value**
White only race	−0.412	4.715	0.030
Sex	0.461	6.510	0.011
Age	−0.118	6.867	0.009
Medicaid only insurance	−0.381	3.976	0.046
Step 2	X^2= 2.810, p=.245, R^2=0.006		
CGAS score	0.014	2.469	0.116
More than one current diagnosis	0.023	0.011	0.916

Did the participant receive medication only in their lifetime?			
Total Model	X^2=11.083, p=0.086, R^2= 0.028		
Step 1	X^2=4.913, p=0.296, R^2= 0.012		
	B	**Wald Chi-Square**	**p value**
White only race	0.289	1.351	0.254
Sex	−0.458	3.500	0.061
Age	0.002	0.001	0.978
Medicaid only insurance	−0.247	1.082	0.298
Step 2	X^2= 6.170, p=0.046, R^2=0.016		
CGAS score	0.028	6.022	0.014
More than one current diagnosis	0.299	1.138	0.286

Did participant receive therapy and medication in their lifetime?			
Total Model	X^2=36.086, p=0.005, R^2= 0.068		

Step 1	$X^2=25.313$, p<0.001, $R^2= 0.048$		
	B	**Wald Chi-Square**	**p value**
White only race	0.212	1.374	0.241
Sex	−0.195	1.309	0.252
Age	0.134	10.313	0.001
Medicaid only insurance	0.544	9.632	0.002
Step 2	$X^2= 10.773$, p=.005, $R^2=0.020$		
CGAS score	−0.027	9.945	0.002
More than one current diagnosis	−0.105	0.064	0.801

*
Coding of variables includes: race: 0=other race, 1= white only; sex variable 0=male, 1=female; insurance variable 0=Medicaid only, 1=other insurance coverage; CGAS: lower scores are indicative of poorer functioning (0–100); comorbid diagnoses variable: 0= no comorbid diagnoses, 1= yes comorbid diagnoses.

Table 4

Service Utilization by Diagnosis & Level of Impairment

Diagnostic Group:	Inpatient		Outpatient						
	Youth with admissions N (%)	Admission in last year N (%)	Lifetime Exposure to Treatment types N (%)				Lifetime Intensive + Outpatient N (%)	Currently utilizing at least 2 services N (%)	
			Evaluation Only	Medication Only	Therapy Only	Medication and Therapy			
Bipolar Spectrum Disorders (n=162)	36 (22.2)	22 (13.6)	7 (4.3)	29 (17.9)	31 (19.7)	90 (57.3)	34 (21.0)	54 (33.3)	
With comorbidities (n=142)	32 (22.5)	18 (12.7)	5 (3.6)	26 (18.8)	25 (18.1)	82 (59.4)	30 (21.7)	51 (35.9)	
Without comorbidities (n=20)	4 (20.0)	4 (20.0)	2 (10.5)	3 (15.8)	6 (31.6)	8 (42.1)	4 (21.1)	3 (15.0)	
	Fisher's Exact test p=1.000	Fisher's Exact test p=0.482	Fisher's Exact test p=0.201	Fisher's Exact test p=1.000	Fisher's Exact test p=0.215	X^2=2.047, p=0.153	Fisher's Exact test p=1.000	X^2=3.451, p=0.063	
Bipolar Spectrum Disorder & CGAS <51 (n=79)	22 (27.8)	10 (12.7)	4 (5.2)	9 (11.7)	17 (22.1)	47 (61.0)	22 (28.6)	32 (40.5)	
Bipolar Spectrum Disorder & CGAS 51 (n=81)	14 (17.3)	12 (14.8)	3 (3.8)	19 (24.4)	14 (17.9)	42 (53.8)	12 (15.4)	21 (25.9)	
	X^2=2.560, p=0.110	X^2=0.157, p=0.692	Fisher's Exact test p=0.719	X^2=4.203, p=0.040	Fisher's Exact test p=0.520	X^2=0.820, p=0.365	X^2=3.935, p=0.047	X^2=3.838, p=0.050	
Depressive Disorders (n=124)	14 (11.3)	6 (5.1)	4 (3.2)	15 (12.1)	34 (27.4)	68 (54.8)	18 (14.5)	41 (33.1)	
With comorbidities (n=118)	14 (11.9)	6 (5.1)	4 (3.5)	15 (13.0)	33 (28.7)	63 (54.8)	18 (15.7)	39 (33.1)	
Without comorbidities (n=6)	0	0	0	0	1 (16.7)	5 (83.3)	0	2 (33.3)	
	Fisher's Exact test p=1.000	Fisher's Exact test p=1.000	Fisher's Exact test p=1.000	Fisher's Exact test p=1.000	Fisher's Exact test p=1.000	Fisher's Exact test p=0.229	Fisher's Exact test p=0.590	Fisher's Exact test p=1.000	
Depressive Disorder & CGAS <51 (n=67)	7 (10.4)	4 (6.0)	2 (3.1)	9 (13.8)	15 (23.1)	39 (60.0)	9 (13.8)	24 (35.8)	
Depressive Disorder & CGAS 51 (n=56)	0	2 (3.6)	2 (3.6)	6 (10.9)	19 (34.5)	28 (50.9)	9 (16.4)	16 (28.6)	
	Fisher's Exact test p=0.688	Fisher's Exact test p=1.000	Fisher's Exact test p=1.000	Fisher's Exact test p=0.628	X^2=1.930, p=0.165	X^2=0.998, p=0.318	X^2=0.148, p=0.700	X^2=0.731, p=0.393	
Disruptive Behavior Disorders (n=212)	8 (3.8)	3 (1.4)	19 (9.0)	32 (15.1)	82 (38.7)	75 (35.4)	12 (5.7)	54 (25.5)	
With comorbidities (n=194)	7 (3.6)	2 (1.0)	17 (8.9)	30 (15.7)	75 (39.3)	69 (36.1)	11 (5.8)	51 (26.3)	
Without comorbidities (n=18)	1 (5.6)	1 (5.6)	2 (11.8)	2 (11.8)	7 (41.2)	6 (35.3)	1 (5.9)	3 (16.7)	
	Fisher's Exact test p=0.514	Fisher's Exact test p=0.235	Fisher's Exact test p=0.658	Fisher's Exact test p=1.000	X^2=0.024, p=0.877	X^2=0.005, p=0.945	Fisher's Exact test p=1.000	Fisher's Exact test p=0.572	

	Inpatient		Outpatient					
	Youth with admissions N (%)	Admission in last year N (%)	Lifetime Exposure to Treatment types N (%)				Lifetime Intensive + Outpatient N (%)	Currently utilizing at least 2 services N (%)
			Evaluation Only	Medication Only	Therapy Only	Medication and Therapy		
Disruptive Behavior Disorder & CGAS <51 (n=81)	2 (2.5)	0	6 (7.6)	9 (11.4)	33 (41.8)	31 (39.2)	4 (5.1)	25 (30.9)
Disruptive Behavior Disorder & CGAS 51 (n=131)	6 (4.6)	3 (2.3)	13 (10.1)	23 (17.8)	49 (38.0)	44 (34.1)	8 (6.2)	29 (22.1)
	Fisher's Exact test p=0.713	Fisher's Exact test p=0.288	X^2=0.364, p=0.564	X^2=1.560, p=0.212	X^2=0.294, p=0.587	X^2=0.560, p=0.454	Fisher's Exact test p=1.000	X^2=2.008, p=0.156

Within these diagnostic categories, children with comorbidities were only counted in the higher diagnostic category. CGAS = Children's Global Assessment Scale. CGAS <51 = major impairment. CGAS 51+ = mild impairment.

Table 5

Characteristics and Benefit of Inpatient & Outpatient Service Utilization based on Caregiver Report

Lifetime inpatient treatment	
Total youth with admissions	65 (9.2%)
Mean number of hospitalizations	2.3 (s.d=3.1)

Most recent inpatient treatment	
Median length of stay (days)	5.0 days
Treatment received during most recent hospitalization	
Medication Only	7 (10.8)
Therapy Only	18 (27.7)
Medication and Therapy	9 (13.8)
No Treatment Reported by parent	11 (16.9)
Parent unsure of all treatments child received	20 (30.8)
How much child benefited from Medication Only?	
Not at all	2 (28.6)
Some	4 (57.1)
A lot	0 (0)
Unknown	1 (14.3)
How much child benefited from Therapy Only?	
Not at all	1 (5.6)
Some	14 (77.8)
A lot	3 (16.7)
How much child benefited from Medication and Therapy?	
Not at all	1 (11.1)
Some	5 (55.6)
A lot	3 (33.3)

Current outpatient treatment	
Number of outpatient professionals	1.2 (s.d=0.7)
Current Treatment	
Medication Only	188 (26.6)
Therapy Only	247 (34.9)
Medication and Therapy	108 (15.3)
Evaluation Only	42 (5.9)
No Ongoing Current Treatments Reported by Parent	99 (14.0)
Parent Unsure of All Types of Current Treatments or Information Unable to be obtained	23 (3.3)
How much child benefited from Medication Only?	
Not at all	24 (12.8)
Some	86 (45.7)
A lot	70 (37.2)
Unknown	8 (4.3)

How much child benefited from Therapy Only?	
Not at all	61 (24.7)
Some	121 (49.0)
A lot	44 (17.8)
Unknown	21 (8.5)
How much child benefited from Medication and Therapy?	
Not at all	7 (6.5)
Some	55 (50.9)
A lot	37 (34.3)
Unknown	10 (9.2)