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ORIGINAL ARTICLE

Supporting the Need for an Integrated System of Care for Youth with Co-occurring Traumatic Stress and Substance Abuse Problems

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Abstract Adolescents are at high risk for violence exposure and initiation of drug use. Co-occurring substance use and trauma exposure are associated with increased risk of mental health disorders, school underachievement, and involvement with multiple systems of care. Coordination and integration of systems of care are of utmost importance for these vulnerable youth. This study delineates the negative sequelae and increased service utilization patterns of adolescents with a history of trauma, substance abuse, and co-occurring trauma and substance abuse to support the need for integrated mental health and substance abuse services for youth. Data from two national sources, the National Child Traumatic Stress Network and Center for Substance Abuse Treatment demonstrate the increased clinical severity (measured by reports of emotional and behavioral problems), dysfunction, and service utilization patterns for youth with co-occurring trauma exposure and substance abuse. We conclude with recommendations for an integrated system of care that includes trauma-informed mental health treatment and substance abuse services aimed at reducing the morbidity and relapse probability of this high-risk group.

Keywords Substance abuse · Trauma · Adolescents · Mental health · Integrated care

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Introduction

The high rates of trauma exposure and substance abuse among adolescents are a major public health concern. Trauma exposure during childhood may include maltreatment (i.e., physical abuse, sexual abuse, emotional abuse, and neglect) and/or domestic and community violence. Two thirds of youth (66%) report at least one traumatic event by age 16 (Copeland et al. 2007). Unfortunately many more youth will be at risk for exposure to multiple events over the course of their lifetime (Finkelhor et al. 2009). Recent epidemiological studies document that 43.5% of adolescents in the U.S. report alcohol use and almost one quarter of youth report drug use (National Institute on Drug Abuse 2010, 2005). While multiple studies document the link between traumatic stress and

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substance abuse in adolescence (see Blumenthal et al. 2008 for a detailed review), studies documenting the need for specialized services within this population are relatively rare.

Childhood is a uniquely vulnerable neurodevelopmental period for exposure to trauma, placing the youth at risk for subsequent substance use disorders. Conversely, the increased autonomy and risk taking that occurs in adolescence may place the youth with substance use at risk for trauma exposure (Giaconia et al. 2003; Najavits et al. 2006). Studies have demonstrated the association of childhood trauma exposure in the development and progression of drug use and dependence in adolescence and early adulthood (Anda et al. 2002; Blumenthal et al. 2008; Chilcoat and Breslau 1998a, b; Dube et al. 2002, 2003). Research has also begun to delineate the short- and long-term sequelae associated with exposure to trauma, substance abuse, and the combination of these experiences. These problems include PTSD, depression, behavioral problems, disruptions in development, attachment and interpersonal difficulties, somatic complaints, and cognitive impairments (Bukstein and Horner 2010). Many of these problems persist well into adulthood and are linked with increased risk for morbidity and mortality (Anda et al. 2009; Brown et al. 2009, 2010; Dube et al. 2009). For many youth, these outcomes are often associated with increased service utilization and engagement of multiple service systems (Blumenthal et al. 2008). Thus, using an integrated systems of care framework to meet the needs of and promote recovery in this population is of utmost importance.

Evidence from adult studies and emerging evidence in adolescent populations support the importance of integrated treatment of co-occurring traumatic stress and substance use disorders (Danielson et al. 2009; Back et al. 2006; Brady et al. 2000). Many Systems of Care (SOC) programs for youth with severe emotional disturbances provide "a comprehensive spectrum of mental health and other necessary services that are organized into a coordinated network to meet the multiple and changing needs of children and adolescents" (Stroul and Friedman 1986, p. 3). Similarly several principles guiding substance use recovery have been developed utilizing a systems of care framework. For example, multiple studies support person-centered approaches that are individualized to meet the unique needs of the youth while including supportive family members and community-based sober peers and adults (Calsyn et al. 2000; Laughame and Priebe 2006; Simpson and Joe 2003). In addition to targeting individual level needs, recovery-oriented systems of care (Sheedy and Whitter 2009) for adolescents must attend to the family context, provide an array of treatment services, and incorporate school resources and other supports. Given the increased likelihood of involvement with multiple service systems, child welfare, juvenile justice, community-based programs and places of worship may also be essential components of the recovery system.

Despite the identified need for an integrated trauma-informed mental health and substance abuse system of care for adolescents, mental health and substance abuse service systems frequently operate independently. Efforts to coordinate care across mental health and substance abuse treatment service settings are minimal. Cross training opportunities between providers in mental health and substance abuse are limited and separate licensure and reimbursement requirements for mental health and substance abuse treatment systems often make developing collaborative treatment strategies challenging. These systemic gaps may lead to provision of treatments that are less effective for youth exposed to trauma who abuse substances.

This study examined the need for integrated systems of care for youth with and without co-occurring trauma and substance use disorders through analysis of data from two national clinical treatment datasets. The overarching hypothesis was that youth with co-occurring traumatic stress and substance abuse would exhibit greater (1) clinical severity, (2) functional impairment, and (3) service utilization, compared to youth with only one of the conditions (i.e., either substance abuse or trauma exposure). Finally, recommended strategies to promote successful integration of systems of care for youth with co-occurring trauma, PTSD and substance abuse disorders are provided.

Methods

Procedures

These analyses represent a collaboration between Substance Abuse and Mental Health Services Administration (SAMHSA) sponsored initiatives within the Center for Mental Health Services (CMHS) and Center for Substance Abuse Treatment (CSAT), contrasting a dataset from centers treating traumatized youth with and without substance use (The National Child Traumatic Stress Network; NCTSN) to another dataset containing information from youth in substance abuse treatment with varying levels of traumatic stress (CSAT Adolescent Treatment Dataset). Analogous data from these two datasets were analyzed to address the study's hypothesis. Clinical staff at NCTSN-funded centers conducted interviews and administered youth and parent self-report questionnaires as part of a comprehensive protocol during the initial diagnostic evaluation or intake session. Individual treatment programs entered their de-identified data into a central web-based data collection system and repository (NCTSN Core Data Set) housed at Duke University. For the CSAT sites,

trained and certified administrators collected data from treatment study clients during a one-on-one treatment intake interview. Data from CSAT sites were entered into the data collection and reporting system (Assessment Building System), either directly through computer administration or after the fact. Individual treatment programs sent their de-identified data to a central data management system at Chestnut Health Systems. The detailed methods utilized for each dataset are further described below.

All handling of data, including de-identification of protected health information and transmission of such, was in compliance with Health Insurance Portability and Accountability Act (HIPAA) standards. Use of aggregate de-identified protected health information for this study was also approved by the Duke University Health System Institutional Review Board and is available for analysis by members of the NCTSN. Information in the aggregated CSAT data set is available for analysis by staff at the participating treatment and evaluation sites as well as by technical assistance staff at Chestnut Health Systems through data sharing agreements.

SAMHSA Sponsored Initiatives

National Child Traumatic Stress Network (NCTSN)

The NCTSN is a SAMHSA funded initiative that includes more than 65 currently funded community-based treatment and academic centers with a common mission to raise the standard of care and improve access to services for traumatized children, their families and communities throughout the United States. The data used in the present study represent a subset of the information contributed by the 56 sites across the US that includes more than 14,000 children ages 0–21 years of age.

NCTSN Core Data Set participant characteristics

For the purposes of this study 3,304 youth, ages 13–17 years, were included in the analyses. The majority of children in the cohort were female (63%) and white (56%). Mean age of the youth was 15.2 years (SD 1.4). Participating adolescents were primarily eligible for public insurance (e.g., Medicaid, 62%).

Classification into Substance Use Categories

Youth in the NCTSN Core Data Set (CDS) were classified into two groups: "trauma only" or "trauma and substance use". Information on youth substance use was collected from three items that were part of the Core Clinical Characteristics Form completed by clinical staff based on information gathered from the caregiver, child, and other relevant collaterals. These ratings were used to classify youth with and without substance abuse problems. Youth were included in the substance use problems group if clinicians indicated that alcohol or substance use was "Somewhat" or "Very Much" a problem on the "Indicators of Severity" items or if the clinician rated them as "Probable" or "Definite" in the Clinical Evaluation item corresponding to a substance use diagnosis. A total of 844 adolescents (25.5%) in the NCTSN CDS subsample were rated as having a co-occurring substance use problem on any of the aforementioned indicators. Outcome measures for this subset of adolescents were compared to those of adolescents without substance use problems who have experienced a myriad of traumatic events (N = 2,460, 74.5%) in subsequent analyses.

NCTSN CDS Dataset Measures

Clinical Severity

Level of clinical severity was measured using the NCTSN standardized battery of parent and child rating scales administered upon mental health treatment program entry. These include the following measures:

Child Behavior Checklist (CBCL; Achenbach 2001) The CBCL is a parent report questionnaire that elicits information about the child's behavioral and emotional problems. Computer generated results are based on norms for age and gender. There are 113 items for the childhood and adolescent forms; responses range from "not true;" "somewhat or sometimes true;" to "very true or often true". The CBCL contains three broadband scales: Internalizing, Externalizing, and Total Problems. T-scores and clinical cut-offs were used to define the borderline and clinical ranges for each scale. Cronbach's α reliability coefficients range from 0.9 for the Internalizing subscale to 0.97 for the Total Problems subscale.

University of California at Los Angeles Post Traumatic Stress Disorder Reaction Index (UCLA PTSD-RI; Steinberg et al. 2004). The UCLA PTSD-RI is a three-part youth self-report assessment tool that screens for exposure to traumatic events, assesses youth's perception of threat or harm related to the traumatic exposure, and the frequency and severity of trauma-related symptoms. Responses to how often trauma-related symptoms have occurred in the past month range from "none", "little", "some", "much" to "most". Collectively responses allow for the systematic assessment of the Diagnostic and Statistical Manual-IV (DSM-IV) PTSD criteria (APA 2000). Cut-scores were used to define full and partial PTSD criteria that are within the borderline and clinical ranges. Reliability coefficient for this sample ($\alpha = 0.89$) was consistent with that of other

psychometric evaluations of this measure (Steinberg et al. 2004).

Functional Impairment

Clinicians completed a comprehensive evaluation form that included information on the types of problems exhibited by youth. The "Indicators of Severity of Problems" section required clinicians to rate whether a child has displayed a series of problems within the past month using a Likert scale ranging from "not a problem", "somewhat/sometimes a problem", to "very much/often a problem". Additionally, the "Clinical Evaluation" section includes a clinician rating on the presence of a series of DSM-IV diagnoses/conditions using a Likert scale ranging from "not present", "probable", to "definite". The current study included the following domains, which were analogous to items in the CSAT database: school problems (behavior problems in school, problems skipping school, academic problems), community problems (behavior problems at home and in the community, criminal activity), and risk-taking behaviors (suicidality, self injury, running away, prostitution).

Service Utilization

Clinicians also provided information on services received within the past month. For each type of service, clinician ratings were dichotomized into "yes" and "no". The current study included the following domains: educational services (special education, counseling), child welfare services (foster care, social services), mental health services (outpatient therapy, case management), juvenile justice (probation, detention, jail), and other treatment services which were analogous to items in the CSAT database. Scores were computed to indicate whether youth received two or more of these services.

Center for Substance Abuse Treatment (CSAT) Adolescent Treatment Dataset

The dataset used in the analyses is from a collection of 119 adolescent substance abuse treatment sites funded by the Substance Abuse and Mental Health Services Administration's Center for Substance Abuse Treatment (SAMHSA/CSAT). Treatment environments included a wide range of largely outpatient and residential settings. The dataset is part of a larger dataset of nearly 150 substance abuse treatment sites. Cases were selected out of the larger dataset on age (13–17 years) and whether the site administered items on trauma symptoms in order to permit categorization of trauma severity (low, moderate, high).

CSAT Dataset Participant Characteristics

Data from 13,871 youths (27% females) entering substance abuse treatment were used for the analyses. The average age of the youth was 15.59 years (SD 1.2). The majority of youth were white (40.7%), followed by Hispanic (26.0%), Multi-racial (15.5%), African-American (15.4%), Other (.9%), Native American (0.8%), and Asian (0.8%).

Classification into Traumatic Stress Categories

Total scores from the Global Appraisal of Individual Needs-Initial (GAIN-I; Dennis et al. 2003) Traumatic Stress Scale (TSS) were used to categorize youth by their severity of trauma symptoms. The TSS is a 13-item, past year, yes/no measure of symptoms related to memories of past trauma, current trauma, or other disorders of extreme stress. Scores are the sum of "yes" responses, with higher scores indicating more problems related to memories of the past. Interpretive cut-offs are low/no (0 symptoms endorsed), moderate (1–4 symptoms endorsed), and high (5–13 symptoms endorsed). The TSS is based on the Civilian Mississippi Scale for PTSD (Hyer et al. 1991).

In the present sample, 64% of the youth reported low trauma severity, 13% reported moderate trauma, and 23% reported high trauma. Trauma profiles varied greatly by gender, with most boys (70%) reporting low trauma compared to only 48% of the girls. Both boys and girls reported 13% moderate trauma, while 39% of girls and 17% of boys reported high trauma. All other demographics examined—race/ethnicity, living in a single parent household, living in a house or apartment for which rent or a mortgage is paid, and age—did not vary by trauma severity.

CSAT Dataset Measures

Global Appraisal of Individual Needs (GAIN; Dennis et al. 2003)

The GAIN is a family of instruments designed to integrate the collection of clinical and research data for substance abuse treatment. The GAIN-I—the intake version of the GAIN instruments—is a comprehensive, standardized biopsychosocial assessment battery. The GAIN-I's main scales have good internal consistency (alpha over .90 on main scales, .70 on subscales) and test–retest reliability (rho over .70 on number of days and problem counts, kappa over .60 on categorical measures) in both adolescent and adult populations. Detailed information on psychometrics and evidence for interpretive cut-offs are publicly available at www.chestnut.org/li/gain.

For the present analysis, GAIN-I scales were chosen to reflect the three outcome domains and to parallel those in the NCTSN dataset (i.e., clinical severity, functional impairment and service utilization).

Clinical Severity

The three scales to assess clinical severity were composed of symptom counts based on diagnostic criteria as defined in the DSM-IV/IV-TR (American Psychiatric Association (APA) 2000, 1994, 2000). All three measures focused on behavior during the past year and responses were on a simple yes/no scale. Categorical values were assigned via scoring rules to designate the level of severity of each condition (low, moderate, and high). *Internalizing Problems* were measured via the GAIN-I's 43-item Internal Mental Distress Scale (IMDS) and included symptoms of somatization, depression, anxiety, suicidality, and traumatic distress. *Externalizing Problems* were measured using the 33-item Behavior Complexity Scale (BCS) and addressed symptoms of attention-deficit/hyperactivity and conduct disorder. *Substance Problems* were measured via the 16-item Substance Problem Scale (SPS) and included symptoms of substance abuse and dependence.

Functional Impairment

Indicators of functional impairment included the presence or absence of past year school problems, criminal or violent behaviors, and risk-taking behaviors. *School Problems* were measured using four yes/no items from the GAIN-I's Training Problems Scale (TPS): gotten bad grades/grades dropped at school, gotten into a fight or trouble at school or training, skipped or cut school or training just because you didn't want to be there, and been suspended or expelled from school or training. *Community Problems* were measured via the General Crime Scale (GCS), a 19-item count of illegal activities related to property, interpersonal, and drug crimes. Interpretive cut-offs applied to the total score designate the level of severity of illegal behaviors (low, moderate, and high). *Risk Behaviors* were measured using four yes/no items from the mental health and risk behaviors sections of the GAIN-I: run away from home for at least one night (run-away); attempted to commit suicide (suicidality); cut, burned or hurt yourself on purpose (self-injury); and trade sex to get drugs, gifts or money (prostitution).

Service Utilization

Use of services in the community during the past 90 days was measured via five items on the GAIN-I: days in foster care, treatment by a mental health provider or use of medication for a mental health problem, criminal justice services (on probation or parole, in jail or detention, under house arrest, or on electronic monitoring), and receipt of special education services or attendance at an alternative school. The one exception to the 90-day window was special education/alternative school services, which was a lifetime measure.

Analyses

Descriptive statistics including means, standard deviations, and frequencies were used to summarize demographic variables including race/ethnicity, gender, age, and caregiver status. Logistic regression models were used to analyze the association between (1) substance abuse status in a group of adolescents with traumatic exposure (trauma only = 0, vs. trauma and substance abuse = 1) and clinical severity, functional impairment, and service utilization for the NCTSN dataset. SPSS version 18 software was used to perform statistical analysis. For the analyses of the CSAT data, the three trauma groups—No/Low, Moderate, and High—were collapsed into two groups: (1) substance abusing youth reporting no or low trauma symptoms, and (2) those reporting moderate or high trauma symptoms. For each of the two trauma groups, the percent of youth whose scores fell within the high (clinical) level of severity were computed for the Internalizing, Externalizing, Substance Problems, and Community Problems indicators. For each remaining indicator (School Problems, Risk Behaviors, and Service Utilization), the total number of items endorsed were summed and the percent of youths who scored at or above the 50th percentile were computed (e.g., service utilization is reported if two or more services were utilized). The 2×2 Pearson chi-square test was computed for each indicator by trauma group. Given the sample sizes are very large, all tests were highly significant. Thus, the odds ratio was chosen as a measure of effect size. The effect size is immune to over-powered tests as a result of large sample sizes and offers an alternative to "statistical significance" focusing instead on "practical significance". A p-value of 0.05 was considered statistically significant.

Results

Youth with a History of Trauma Enrolled in Mental Health Programs (NCTSN Dataset)

Clinical Severity of the NCTSN Cohort

The adolescents in the NCTSN Core Data Set represented a highly traumatized group (mean number of traumas was 4.19, SD = 2.65; range 1–15). The percentage of children

Table 1 Descriptive analysis and odds ratios of outcome domains for youth in the NCTSN core data set (N = 3,304)

Domain	Trauma only (%)	Trauma and substance use (%)	Odds ratios (95% CI)
Clinical severity[a]			
Internalizing problems	45.2	52.3	1.3 (1.09–1.61)
Externalizing problems	40	71.3	3.7 (3.02–4.59)
Total problems	47.5	64.3	2.0 (1.63–2.43)
PTSD[b]	65.8	73.7	1.5 (1.21–1.76)
Functional impairments			
School problems	68.3	81.9	2.1 (1.72–2.58)
Community problems	51.7	75.3	2.8 (2.38–3.39)
Risk-taking behaviors	25.7	49.6	2.9 (2.42–3.35)
Service utilization (2+ services of 5)	62.3	71.3	1.5 (1.24–1.80)

[a] Cut-off scores suggested by the developers of the clinical severity measures were used to define the borderline-clinical range for the CBCL (internalizing, externalizing, and total problems) broadband scales

[b] UCLA-PTSD-RI overall score for PTSD

with a history of trauma exposure and substance abuse who have scores in the borderline to clinically significant range on the Internalizing, Externalizing and Total Problems scales of the CBCL was significantly higher than the percentage of children with a trauma history alone (Table 1). The odds of having a borderline to clinically significant Internalizing score on the CBCL were 30% higher for children with a history of trauma and substance abuse compared to children with trauma alone (1.3, 95% CI: 1.09–1.61). Children with trauma and substance abuse had almost four times the odds of scoring in the clinical or borderline range on the Externalizing scale compared to their trauma only peers (3.7, 95% CI: 3.02–4.59). The odds of having a borderline to clinical Total Problems score were twice as large for children with trauma and substance abuse compared to trauma only youth (2.0, 95% CI: 1.63–2.43). There was a 50% increase in the odds of scoring in the borderline to clinical range on the PTSD-RI (1.5, 95% CI: 1.21–1.76).

Functional Impairment of NCTSN Cohort

The odds of school problems were twice as large among children with a history of substance abuse and trauma exposure compared to trauma alone (2.1, 95% CI: 1.72–2.58). The odds of community problems and risk behaviors for the population of youth with substance abuse and trauma were approximately three times greater than the odds among youth with trauma only (2.8, 95% CI: 2.38–3.39 and 2.9, 95% CI: 2.42–3.35, respectively).

Service Utilization of NCTSN Cohort

Utilization of two or more services including involvement with the juvenile justice system, foster care, special education, etc. was significantly higher for youth with a history of trauma and substance abuse as compared to youth with trauma alone (1.5, 95% CI 1.24–1.8).

Table 2 Descriptive analysis and odds ratios of outcome domains for youth in the CSAT dataset (N = 13,871)

Domain		Trauma group[a]		Odds ratios (95% CI)
Measure (score range)	n	Mod/Hi[b] (%)	No/Low[c] (%)	M/H versus N/L
Clinical severity[d]				
Internalizing problems (high)	13,871	22.9	0.1	291.3 (151.0–561.9)
Externalizing problems (high)	13,856	36.0	11.4	4.4 (4.0–4.8)
Substance problems (high)	13,862	47.2	21.4	3.3 (3.1–3.5)
Functional impairment[d]				
School problems (2+ problems of 4)	5,107	72.0	59.7	1.7 (1.5–2.0)
Community problems (high)	13,764	45.9	24.9	2.6 (2.4–2.8)
Risk behaviors (1+ behaviors of 4)	8,686	53.8	23.7	3.8 (3.4–4.1)
Service utilization[e] (2+ services of 5)	13,609	59.9	46.1	1.8 (1.6–1.9)

[a] All youth were current substance users who varied by the severity of their trauma symptoms

[b] Mod/Hi = youth who reported one or more symptoms of trauma on the traumatic stress scale

[c] No/Low = youth who reported no symptoms of trauma on the traumatic stress scale

[d] The time frame for these measures is "past year"

[e] The time frame for these measures is "past 90 days," except the lifetime measure of special education/alternative school

Youth Enrolled in Substance Abuse Treatment Programs (CSAT Dataset)

Clinical Severity of CSAT Cohort

Youth enrolled in substance abuse treatment with moderate to high trauma symptom severity had nearly 300 times (291.3, 95% CI: 151.0–561.9) the odds of high Internalizing symptoms compared to youth in substance abuse treatment with no to low trauma symptom severity (Table 2). The odds of a more severe level of externalizing problems were four times higher (4.4, 95% CI: 4.0–4.8) for youth in substance abuse treatment with moderate/high severity trauma symptoms compared to those with no/low symptoms. Youth with moderate to high trauma symptom severity had over three times (3.3, 95% CI: 3.1–3.5) the odds of having a more severe substance use disorder compared to their peers in substance abuse treatment with no to low trauma symptom severity.

Functional Impairment of CSAT Cohort

School problems were more frequently reported for youth in substance abuse treatment with moderate to high traumatic stress symptoms (odds 1.7, 95% CI: 1.5–2.0). The odds of being involved in crime and violence (Community Problems) were 2.6 times higher for youth in the moderate to high traumatic stress symptoms group compared to their no to low peers. Risk behaviors were also significantly increased (3.8, 95% CI: 3.4–4.1) in youth with moderate to high severity trauma symptoms compared to the no to low trauma symptom severity group.

Service Utilization of the CSAT Cohort

Service utilization for youth enrolled in substance abuse treatment with moderate to high trauma symptom severity had 1.8 times (95% CI: 1.6–1.9) the odds of using two or more services (e.g., criminal justice, foster care, special education, etc.) compared to youth in drug treatment with no to low trauma symptom severity.

Discussion

Findings from this study of two large national datasets provide evidence supporting the co-occurrence of complex symptom patterns of traumatic stress and substance that would benefit from an integrated system of care (Stroul and Friedman 1986, 1996). Youth with co-occurring traumatic stress and substance abuse problems were more likely to experience multiple traumatic events. Both datasets demonstrate statistically and clinically significant increases in emotional and behavioral symptom severity (i.e., Internalizing, Externalizing and PTSD symptoms), functional impairment (e.g., school problems, community problems, and risk-taking behaviors), and multi-system involvement (e.g., criminal justice, child welfare, special education, etc.) among youth with co-occurring trauma exposure and substance abuse compared to youth with only one of these conditions. While these findings are not surprising, they do highlight the need for important system-level changes (including enhanced assessment strategies, services, interventions, and policies) to identify and respond to the complex needs of youth with co-occurring traumatic stress and substance use difficulties.

Trauma-informed systems of care treatment strategies are required to address the complex needs exhibited by youth with co-occurring trauma and substance abuse problems. Providing exclusively one type of treatment service, either mental health or substance abuse treatment, will not adequately address the needs of these vulnerable and high risk youth. Comprehensive multi-system interventions and treatment services, involving the child, parent, school, community, and health care systems are of paramount importance to successfully treat adolescents with co-occurring trauma and drug dependence. To this end, several important recommendations for the successful integration of substance abuse and trauma informed mental health treatment and services that are in line with the systems of care framework are described below.

1. Systematic screening and assessment for trauma exposure, traumatic stress symptoms and substance abuse problems should be routinely provided across service systems. Community programs and services should provide early identification and support for at risk youth, paying attention to existing gender differences in rates of trauma exposure and substance use. Comprehensive assessments ensure that services can be tailored to the unique needs of youth and their families based on the level of clinical severity, stability in the home environment, and safety and supports available within the community. Moreover, ongoing assessment ensures that services and progress are monitored over time. Providers can access available resources for assessing trauma exposure (e.g., Strand et al. 2005; www.nctsn.org) and substance abuse (e.g., Allen and Colombus 2003; Winters 1999; Winters et al. 2009).

2. Youth should have access to a wide range of treatment options and services that can accommodate the need for higher levels of care. The recognition that individuals and families often will experience complex and long term needs should already be standard practice within the SOC framework, but is often not the case for youth with co-occurring trauma and substance abuse problems. Chronic care strategies in which comprehensive services are provided beyond the treatment system are needed

(Sheedy and Whitter 2009). This includes the delivery of approaches that not only focus on symptom reduction, but also increase environmental stability (e.g., home based services and crisis supports focusing on increasing safety in the home and community; and offering services and support for parents experiencing physical, emotional or social problems) and improve youth academic and social functioning (e.g., providing school advocacy, access to safe recreational opportunities and access to quality mentorship). Sheedy and Whitter (2009) describe the adoption of a community model in which services are provided in communities and specific environments of need by professionals, family members and peers. O'Connell et al. (2005) also describe the need to employ a strength based approach capitalizing on family and community supports which emphasizes stability and change in the home environment, advocacy, vocational training, developing a positive connection with the community, as well as the development of positive social roles, hobbies and meaningful activities. In addition to improving outcomes for youth already experiencing problems, community programs and services targeting at risk youth may decrease the likelihood of further trauma exposure and progression into substance use and abuse.

3. Develop or enhance structural resources that facilitate linkages and connections among providers to foster more integrated service sectors. In order for services to be truly integrated, changes need to be implemented across the entire system, not just within individual programs, requiring specific coordination between mental health and substance abuse treatment settings (Minkoff and Cline 2004). To bridge existing gaps, sites and programs implementing system of care practices must allocate resources to develop initiatives that emphasize the provision of a continuum of care and coordinated services. This can be achieved by employing a team approach that cuts across agencies, disciplines, and service systems. Furthermore, this may include the development of formal and informal partnerships among agencies or providers, memorandums of agreement, as well as the regular use of multi-disciplinary and multi-agency team meetings focused on addressing individual needs of youth and their families. Given the findings of the present study that suggest increased service utilization, case management services should be provided to assist youth and families as they navigate various service systems, agencies, and policies within their communities. Insurance reimbursement for mental health and substance abuse treatment has remained a barrier to coordinated health access. The Paul Wellstone and Pete Domenici Mental Health Parity and Addiction Equity Act of 2008 (MHPAEA) was enacted to address this challenge and create parity between physical health, mental health and substance abuse treatment reimbursement from insurance providers. Effective January 2010, separate cost-sharing requirements were eliminated as well as differential limitations on treatment and cap benefits. Once fully implemented, MHPAEA should facilitate the delivery of integrated and coordinated services among SOC sites.

4. Cross training across fields and settings should emphasize system of care principles and foster increased understanding of assessment and treatment services specific to both trauma and substance abuse so that services can be fully integrated. Individuals with co-occurring disorders may not receive the full extent of needed services when they enter the mental health or substance abuse service systems because providers are not trained in identifying, assessing or treating problems often addressed in other settings. Rather than treating one problem first before moving on to the other, experts suggest early emphasis on managing and reducing both substance abuse and trauma related sequelae/PTSD symptoms (Back et al. 2000; Giaconia et al. 2003; Oimette and Brown 2003). This is best achieved when providers are able to attend both to traumatic stress and substance abuse symptoms in one setting. While fully integrated services may not be readily available, cross-training can facilitate the provision of trauma-informed substance abuse services as well as substance abuse-informed trauma/mental health services. For example, within this population training should foster increased understanding of the association between trauma reminders and substance use triggers and cravings. Cross training will facilitate the use of a common language and common methods across service systems, which is more likely to occur among sites applying a systems of care approach. Training should also emphasize use of evidence based strategies across service systems. While evidence-based integrated treatment programs or practice models have not yet been established for this population, there are empirically supported treatment components drawn from available research which could be implemented with this population. These include providing psychoeducation for youth and caregivers about traumatic stress and substance abuse; developing stress management and emotional regulation skills, cognitive restructuring techniques; gradual exposure for desensitization to trauma reminders; increasing problem-solving, drug refusal and safety skills; parental involvement in treatment to increase parenting skills, communication and conflict resolution; psychopharmacological treatment; and random urine screenings (Cohen et al. 2003).

In sum, treatment and service policies need to accommodate the need for greater integration, cross training, resource allocation, and program development. Figure 1 illustrates needed components of youth-oriented integrated systems of care suitable for adolescents experiencing traumatic stress and substance abuse problems, adapted from Sheedy and Whitter's (2009) recovery-oriented systems of care framework. Needed services and supports

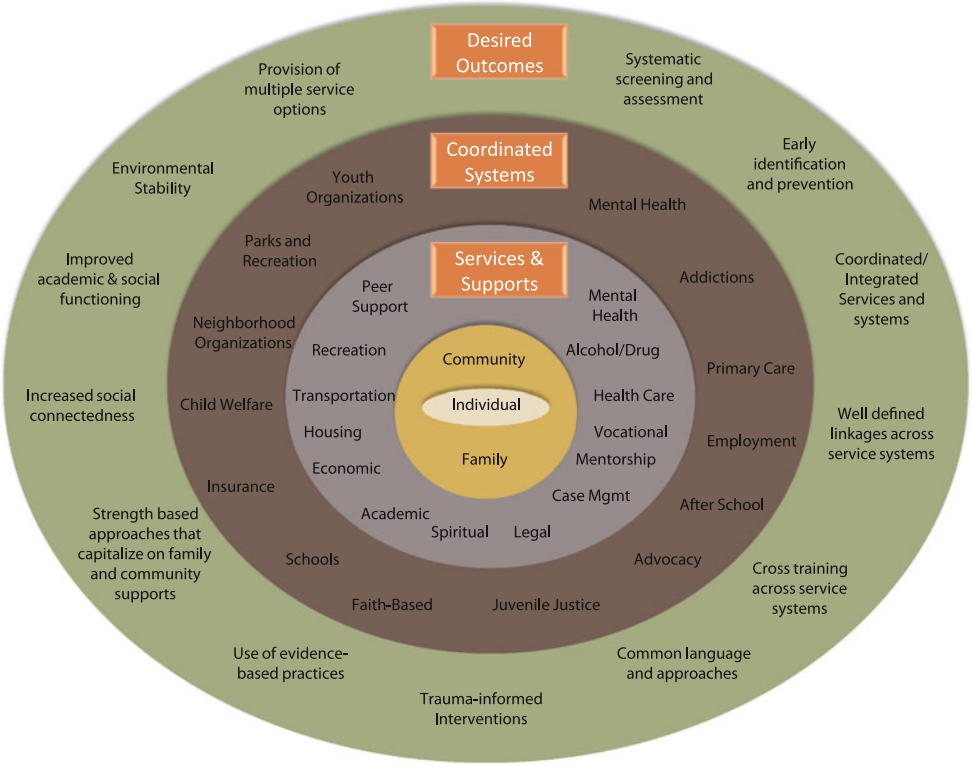

Fig. 1 Youth-oriented integrated systems of care suitable for adolescents with traumatic stress and substance abuse problems adapted from Sheedy and Whitter's (2009) recovery-oriented systems of care framework

incorporate physical, and emotional and social well-being. The coordinated systems illustrated include service delivery (mental health, substance abuse, primary care) as well as important community programs for which multisystem collaboration is paramount. Figure 1 also shows desired outcomes within the service system, community and youth/family level which would result from implementing the recommendations described in this paper.

The present study findings provide overwhelming evidence documenting the range of problems experienced by adolescents with co-occurring traumatic stress and substance abuse problems, as well as their involvement with multiple service systems using data from two large national datasets representing SAMHSA funded collaborative initiatives in the mental health and substance abuse fields. These findings reinforce the need for system level changes that narrow or close the gap between mental health and substance abuse services and incorporate a coordinated approach that capitalizes on family and community resources. Specific funding mechanisms are needed to continue collaborative partnerships and support the development of integrated service models that involve system level changes meant to better address the needs of these youth. Additionally, more research is needed to determine the effectiveness of integrated treatment approaches and coordination of services and programs for youth with co-occurring traumatic stress related sequelae (e.g., PTSD symptoms) and substance use disorders. Given the myriad of consequences associated with adolescent substance use (e.g., risk-taking behaviors, delinquency, health problems, and accidental death (Latimer and Zur 2010; Lomba et al. 2009; Howard et al. 2010; Vaughn et al. 2010), it is imperative that interagency collaboration, family and youth involvement, cultural competence, and accountability go beyond guiding principles to create a coordinated treatment system of care for adolescents. Despite the long-term nature of the proposed process it is critical that we begin to create systemic changes in the health care delivery model especially for those youth at increased risk for trajectories marked by high rates of morbidity and mortality.

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TI17070, TI17433, TI17434, TI17446, TI17475, TI17484, TI17486, TI17490, TI17517, TI17523, TI17535, TI17604, TI17605, TI17638, TI17728, TI17755, TI17761, TI17763, TI17765, TI17769, TI17779, TI17786, TI17788, TI17812, TI17825, TI17830, TI13313, TI13344, TI13354, TI13356, TI13305, TI13322, TI13345, TI13308, TI13323, TI15678, TI15670, TI15486, TI15511, TI15433, TI15479, TI15682, TI15483, TI15674, TI15467, TI15686, TI15481, TI15461, TI15475, TI15413, TI15562, TI15514, TI15672, TI14376, TI14261, TI14189, TI14252, TI14315, TI14283, TI14267, TI14188, TI14272, TI14090, TI14271, TI14196, TI14311, TI15478, TI15447, TI15545, TI15671, TI15527, TI15489, TI15485, TI15524, TI15446, TI15466, TI15584, TI15438, TI15415, TI15421, TI15586, TI15469, TI15577, TI15458, TI15677, TI13601, TI13190, TI17476, TI17589, TI17646, TI17648, TI17673, TI17702, TI17719, TI17724, TI17742, TI17744, TI17751, TI17775, TI17817, TI17831, TI17864, TI18406, TI18587, TI18671, TI18723, TI19313, TI19323, and 655374.

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