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Use of Mental Health Services by Adolescents After Traumatic Brain Injury: Findings From a Randomized Controlled Trial^a

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Abstract

Background—Mental health problems are common after pediatric traumatic brain injury (TBI). Many patients in need of mental health services do not receive them, but studies have not consistently used prospective and objective methods or followed samples for more than 1 year.

Objective—To examine adolescents' use of mental health services after TBI.

Design—Secondary analysis from multicenter prospective randomized controlled trial.

Setting—Five level 1 US trauma centers.

Participants—Adolescents aged 12 to 17 years with moderate-to-severe TBI were recruited for a randomized clinical trial (n=132 at baseline, 124 at 6 months, 113 at 12 months, and 101 at 18 months).

Methods—Participants were randomly assigned to counselor-assisted problem-solving or Internet resource comparison. Follow-up assessments were completed at 6, 12, and 18 months after baseline. Generalized estimating equations with a logit link were used to examine use of

^aNo medical devices were used in this study.

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mental health services. Treatment group and participant impairment were examined as predictors of use.

Main Outcome Measurements—Mental health care use was measured with the Service Assessment for Children and Adolescents; daily functioning and clinical outcome with the Child and Adolescent Functional Assessment Scale; behavioral and emotional functioning with the Child Behavior Checklist; and executive dysfunction with the Behavior Rating Inventory of Executive Function.

Results—Use of mental health services ranged from 22% to 31% in the 2 years post-TBI. Participants with impairments were about 3 times more likely than those without impairments to receive services (odds ratio, 4.61; 95% CI, 2.61–8.14; $P<.001$). However, 50% to 68% of patients identified as impaired had unmet mental health care needs.

Conclusions—Less than half of adolescents with behavioral health needs after TBI received mental health services. Future studies are needed to examine barriers associated with seeking services after TBI and psychoeducation as preventive care for this population.

Keywords

adolescents; health care use; pediatric; traumatic brain injury

Introduction

Traumatic brain injury (TBI) is one of the most common causes of acquired disability in children and adolescents in the United States (1). Often termed the “silent epidemic,” TBI can alter normal development and adversely affect cognitive, behavioral, and emotional functioning, resulting in considerable lost potential (2–4). The annual incidence is 304 per 100,000 patients younger than 18 years, with approximately 60,000 patients aged 19 years or younger hospitalized annually (1,5). The financial burden for this patient group is considerable. The cost of inpatient and outpatient rehabilitation, long-term care, and ongoing medical monitoring has been estimated at over \$1.5 billion in the first year after injury alone (6).

Although quality indicators for acute inpatient rehabilitation have been identified (7), there is still large variation in adherence to these care indicators (8). Specifically, substantial variation exists in addressing neurobehavioral, psychosocial, cognitive, and communication needs and facilitating community reintegration (9,10). Various degrees of psychoeducation and follow-up are provided to patients and families upon discharge from inpatient rehabilitation settings, leaving many uninformed and unprepared when problems occur. Providing adequate and timely follow-up care is a crucial factor in optimizing functioning after trauma, especially TBI (11). Unfortunately, numerous studies have found low rates of medical and mental health follow-up in this group despite demonstrated need (12–15).

Children and adolescents with preexisting psychiatric problems are overrepresented in TBI populations, and these conditions can be exacerbated after injury (16). Novel diagnoses of attention-deficit/hyperactivity disorder and oppositional defiant disorder after TBI are not uncommon (13,17–19). Problems with anxiety and symptoms of new-onset obsessive-

compulsive disorder are also documented post injury (19–23). Educating families as to these possibilities and swiftly providing care if the problems do occur can reduce morbidity associated with TBI.

This report offers a secondary analysis of a prospective longitudinal data set collected as part of a randomized clinical trial examining the efficacy of an online family problem-solving intervention in improving child behavior problems in youth who sustained a moderate to severe TBI in the previous 6 months. Primary analyses revealed significant reductions in behavior problems and executive dysfunction among older adolescents receiving the problem-solving treatment that were maintained over time (24–27). Group differences in global child functioning were not apparent until the final assessment, when youth in the problem-solving group were rated as having significantly better functioning than those in the control group who received access to online resources for TBI but not problem-solving therapy (25).

The objective of the present report was to characterize post-TBI mental health care utilization as a function of clinical need among adolescents in this well-characterized cohort. Families were followed in this study for 18 months, providing a unique opportunity to assess mental health needs and services across an extended period. We also examined participant characteristics associated with overall service utilization and with services as provided in inpatient, outpatient, and school settings. As a secondary objective, we examined whether treatment group assignment explained variations in service utilization. Greater understanding of post-TBI needs and potential barriers to treatment will allow for the design of health care models that are appropriate and sustainable and reduce long-term morbidity.

Methods

Participants

Participants in the randomized clinical trial NCT00409448 were recruited from 5 major level 1 trauma centers (3 large tertiary children's hospitals and 2 general hospitals) in the central and western regions of the United States. The study was approved by the institutional review board of each participating medical center.

Potential participants included adolescents aged 12 to 17 years who had been hospitalized overnight or longer for a complicated moderate to severe TBI within the previous 1 to 6 months. Lowest postresuscitation Glasgow Coma Scale (GCS) scores and imaging findings were used to classify participants as having sustained moderate or severe TBI. The *moderate* classification was for adolescents with GCS scores of 9 to 12 or a higher GCS score with evidence of TBI-related neuroimaging abnormalities on computed tomography or magnetic resonance imaging. *Severe* was for adolescents with GCS scores less than 9. Additional requirements for inclusion were 1) English as the primary language spoken in the home, 2) availability of the adolescent to participate in the intervention, and 3) family residence being within a 3-hour drive of the hospital. Exclusion criteria were 1) insufficient recovery 6 months after injury (eg, being in a minimally responsive state), 2) psychiatric hospitalization of the adolescent or a parent within the year prior to the injury, 3) residence outside the home (eg, in a detention facility) or in an area without high-speed Internet access, and 4) a

preinjury diagnosis of intellectual disability. Of the 308 potential participants, 52 (17%) were ineligible because they did not meet 1 or more of these criteria. The primary reason for exclusion was the English language requirement (8% were excluded for this reason) (Figure 1).

Sample characteristics are summarized in Table 1. Of the total sample recruited, 61% had moderate TBI and 39% severe TBI. The sample comprised more males (65%) than females (35%). The sample was 80.3% white (19.7% nonwhite), with a median income of \$64,000. Participants were randomly assigned to a counselor-assisted problem-solving (CAPS) group or an Internet resource comparison (IRC) group. Randomization was stratified by race and gender to ensure equivalent group composition for these factors. After the baseline assignment, participants received a sealed envelope containing the group assignment, allowing the coordinator to remain naive to the assignment.

Participants in the CAPS group received 6 months of a web-based, family-centered intervention focused on problem solving, communication, and self-regulation. Families received 8 core and as many as 4 supplemental sessions. Participants in the IRC group received links to online resources for TBI, including local, state, and national brain injury associations and sites specific to pediatric brain injury. Families were asked to spend 1 or more hours per week reviewing the online content on pediatric brain injury throughout the 6-month treatment period, and they were encouraged to track the sites they had visited in a logbook. This logbook was collected at the conclusion of treatment. The CAPS and IRC groups did not differ in the amount of time engaged in the intervention (28).

Of the adolescents enrolled, 94% remained in the study until the completion of the intervention 6 months post baseline. Further follow-ups were conducted at 12 and 18 months post baseline, at which time 86% and 77% of participants, respectively, remained in the study. Comparison of families who completed the follow-ups with those who did not showed that the parents who dropped out tended to be younger ($P=.06$), had lower incomes ($P=.01$), and were more likely to be single parents ($P=.009$). The adolescents who dropped out also had significantly higher levels of behavioral problems at baseline ($P=.007$). Differences in attrition between treatment groups were not significant ($\chi^2=2.27$; $P=.13$).

Measures

The primary outcome measure for this study was the Services Assessment for Children and Adolescents (SACA) (29). The SACA is a parent interview that assesses various aspects of mental health care use by children and adolescents. For the present study, the SACA module asked parents to report the type of mental health services their child had received in outpatient or inpatient settings after TBI. The SACA uses specific terminology to assess utilization of school-based mental health services compared with services provided for cognitive or learning problems. Questions included inquiries as to whether a child had received “special help (such as tutoring or training) in the regular classroom for problems with behaviors or feelings” or had been placed in “a special school” or “special classroom for problems with drugs or alcohol, behaviors, or feelings.” Use of school-based counseling or therapy was also assessed. The SACA thus identified the use of school-based services for

more traditional mental health problems, rather than academic/cognitive support for learning problems that may or may not be associated with TBI.

Previous work has suggested that the SACA has very good test-retest reliability, with κ values ranging from 0.82 to 0.94 for lifetime services and from 0.75 to 0.86 for service use in the previous year (29). The validity of the SACA is moderate to very good when comparing the parent report with nonschool service records ($\kappa=0.67$ for outpatient, $\kappa=1.0$ for residential, and $\kappa=0.76$ for any services) (30). However, validity is fair only when comparing the parent report with school service records ($\kappa=0.31$), possibly related to parent confusion regarding the multiple levels and classifications of school services (eg, Title I, 504 plan, Individualized Education Plan, school-based therapies, and social work services).

An index of impairment was based on the combination of 3 behavioral measures: the Child and Adolescent Functional Assessment Scale (CAFAS), the Child Behavior Checklist (CBCL) Internalizing and Externalizing scales, and the Behavior Rating Inventory of Executive Function (BRIEF)–Global Executive Composite (BRIEF-GEC). The CAFAS is a structured clinical interview designed to assess adolescents' day-to-day functioning in home, school, and community settings and to monitor changes in functioning over time (31). The CAFAS yields a total score from 0 to 240, which is determined by adding ratings across the 8 subscales of school, home, community, behavior toward others, moods/emotions, self-harmful behaviors, substance abuse, and thinking. Interrater reliability for the CAFAS is good to very good, with correlation coefficients ranging from 0.74 to 0.99 (32). For the present study, a doctoral-level psychologist and a master's-level counselor attended a 2-day training session provided by the CAFAS developer to achieve CAFAS certification. The psychologist and counselor then trained all site raters to the point of 80% reliability on necessary tests as recommended by the CAFAS developer. Trainers and raters subsequently participated in monthly telephone conferences throughout the study to review recently administered CAFAS interviews, to pose and answer questions, and to ensure that each site continued to apply ratings according to the standardized guidelines. The CAFAS trainer double rated 10% of each rater's CAFAS interviews, with interrater reliability of 90% for the present study.

The CBCL is a parent report measure of behavioral and emotional functioning in children and adolescents aged 6 to 18 years (33). The measure has 8 empirically based syndrome scales: Anxious/Depressed, Withdrawn/Depressed, Somatic Complaints, Social Problems, Thought Problems, Attention Problems, Rule-Breaking Behavior, and Aggressive Behavior. The subscales are used to derive a Total Problems score and Internalizing and Externalizing scores. The 1-week test-retest reliability for the CBCL in nonreferred children is very good for the 118 specific problem items ($\kappa=0.95$) (33).

The BRIEF is a parent report measure of executive function and self-regulation in children and adolescents (34). The Global Executive Composite is made up of the Behavioral Regulation Index and the Metacognition Index. Interrater reliability for the parent report form of the BRIEF is very good ($\kappa=0.82$) (34).

For the present study, a single index was used to define *impairment at baseline*, based on clinically significant scores on any of the 3 behavioral measures (CAFAS, CBCL Internalizing or Externalizing scales, or BRIEF-GEC). Impairment was defined as a score at or above 50 on the CAFAS; T-scores at or above 63 on the Internalizing or Externalizing scales of the CBCL, as consistent with prior studies of this sample; and T-scores at or above 65 on the BRIEF-GEC. Youth with impairment who had not received services during the 2-year study period were considered to have unmet needs.

Statistical Analysis

Family socioeconomic status (SES) was defined by the mean of the sample *z* scores for parental income and years of education. Assessments were conducted at baseline and at 6, 12, and 18 months post treatment. The analytic models were lagged with earlier functioning predicting subsequent service. For example, functioning 7 to 12 months post baseline was examined in relation to mental health service utilization at 12 months.

Summary statistics such as frequency (percentage), mean (SD), and median (range) were calculated to describe the score distributions and differences over time between groups and youth with and without impairment. Associations of predictors and moderators to utilization of mental health services over time were tested using generalized estimating equations (GEEs) with a logit link. The interaction between group and time in the GEE was examined using the χ^2 test (35), a standard output of type III GEE analysis. An α level of less than .05 signified statistical significance. All data were analyzed with SAS version 9.3 software (SAS Institute Inc, Cary, North Carolina).

Results

Use of Mental Health Services

In this study, 22% to 31% of participants were using mental health services at any given time during the 2-year study period. Specifically, at baseline 30% of study participants (40 of 132) reported that they were receiving some type of mental health service on an outpatient or inpatient basis or through school. Use of services was 31% at 6 months post baseline (38 of 124), 28% at 12 months (32 of 113), and 22% at 18 months (22 of 101). Service use was generally stable over the 2-year period. Outpatient services were used most commonly (58%–86% over the 2-year period). School services (25%–30%) and inpatient services (2%–13%) were used less frequently. As shown in Table 2, there was no difference in service use based on group assignment or time from injury ($\chi^2=0.74$; $P=.86$).

Use of Mental Health Services According to Impairment

Table 3 shows adolescents' mental health service use according to impairment by treatment group over time. For both the CAPS and the IRC groups, no more than half of impaired participants received services at any time during the 2-year study period. Unmet need in the CAPS group ranged from 50% to 68%, while 54% to 64% in the IRC group had unmet needs. A number of adolescents in this study who were not rated as impaired at baseline did, nevertheless, receive mental health services (13%–16%).

Three measures were used to identify post-TBI impairment in this study. Impairment was most readily detected by the CAFAS, which was elevated in 73% of impaired participants, followed by the BRIEF-GEC (elevated in 60%). The CBCL Internalizing scale identified 38% of those impaired, while the CBCL Externalizing scale identified 30% of those with impairment.

Table 4 shows the proportion of participants receiving mental health services by impairment group for each visit. Impaired participants were about 3 times more likely to receive services compared with nonimpaired participants: 38% to 48% of impaired adolescents were receiving services at any follow-up time compared with 13% to 16% of unimpaired adolescents ($P<.001$). Use of services remained stable in both groups over time, with a nonsignificant impairment-by-time interaction ($P=.79$).

Use of Mental Health Services According to Demographic Variables

Participant gender, race/ethnicity, and SES did not predict mental health service use in the 2 years after TBI. While not statistically significant, data revealed a trend for higher service utilization with increasing age at the time of injury (odds ratio, 1.27; 95% CI, 0.99–1.63; $P=.064$). However, older adolescents did not have higher rates of impairment, suggesting that increased use in that group was driven by other factors. All demographic results are shown in Table 5.

Discussion

In this study, 22% to 31% of adolescents with moderate to severe TBI used mental health services at some point during the 2-year study period. Utilization of outpatient, inpatient, and school-based services was stable across the 2-year period, ranging from 28% to 31%. Outpatient services were utilized most often, followed by school services and then inpatient services.

Health care utilization is most meaningful when examined along with patient need for services. In this pediatric TBI population, less than half of those individuals who met our criterion for impairment—and were thus viewed as in need of services—received care. The need for care exceeded the provision of services by more than 50% at every time point examined. At baseline, only 40% of adolescents who were rated by their parents as impaired on the CAFAS, CBCL, or BRIEF-GEC were receiving services. At 6, 12, and 18 months after baseline, respectively, 46%, 48%, and 38% of those who were impaired were receiving services.

The findings from this study are consistent with those of previous studies that have shown considerable unmet or unrecognized service needs in the pediatric TBI population. Our rates of unmet need were somewhat higher than those reported by Slomine and colleagues (14). In their telephone interviews of primary caregivers of children with TBI, 26% and 31% of children at 3 and 12 months after injury, respectively, had unmet or unrecognized health care needs. In the present study, the rate of unmet need ranged from 52% to 62% across the 2-year follow-up period. Our higher rates of unmet need may have reflected use of an impairment index based on elevated ratings on the CAFAS, CBCL, or BRIEF. This may

have resulted in greater sensitivity to need or a broader definition of need than the definition used by Slomine et al (14) utilizing the Pediatric Quality of Life Inventory only.

Our findings of unmet need in the pediatric TBI population were similar to those reported by Keenan and colleagues (12). They found that approximately 50% of children with TBI older than 7 years had no primary care visits in the year following their injury. Their analysis also found that these children were not substituting specialty care for primary care. Similarly, Karver and colleagues (36), who focused on behavioral problems in children aged 3 to 7 years who had sustained TBI or an orthopedic injury, concluded that children in both groups had considerable unmet needs as defined by parent ratings of child behavior. Their study suggests that the problem of unmet mental health care needs may not be specific to pediatric TBI populations and may be a pervasive problem across ages and injury groups.

A previous study of our sample of adolescents with moderate to severe TBI by Kurowski and colleagues (15) focused on health care use in the first 6 months after baseline but before random assignment to intervention. In that study 37% to 56% of participants had mental health care needs according to elevations on the CBCL and CAFAS, respectively. Only 28% of those in need received any type of mental health service. The present extended study followed this sample out to 18 months post baseline and found high rates of unmet need across the follow-up period. The previous study differed from the present study in that it did not utilize the BRIEF-GEC or an overall impairment index. Our findings suggested that impairment classification was mostly driven by elevated ratings on the CAFAS and the BRIEF-GEC, and to a lesser extent the CBCL. The variable rates of impairment and thus, need, found in these 2 studies using the same participants highlights the influence of measurement tools on findings. This may partly explain why our findings of impairment and unmet need are higher than reported by others (14,15). The CAFAS and the BRIEF-GEC may be particularly sensitive to postacute problems in pediatric TBI.

Our study found surprisingly low rates of school-based behavior services being provided to adolescents in the 2 years after TBI. The reasons for this low rate of school-based services are not entirely clear, but low rates of school services for patients with TBI are not unique to our sample. According to the Office of Special Education and Rehabilitative Services in the US Department of Education, approximately 145,000 children were identified as having TBI in 2011 (37), but only 24,878 (17%) received special education services under that category (38,39). This gap between need and service provision is what has led some authors to term TBI the “silent epidemic.” Adolescents who are physically well enough to return to school may appear healthy to school professionals who may be unaware of the relationship between TBI and behavioral and emotional problems. Conversely, school professionals may overlook or excuse problems in students who have experienced brain injuries. Adolescents who exhibited behavioral problems before their head injury may be considered to be exhibiting “more of the same” rather than prompting a referral for special education services.

There are indications that availability of school-based services after TBI may be slowly changing as awareness of TBI sequelae has increased. Many medical providers have adopted more standardized return-to-school guidelines, which may include school accommodations as needed. Some schools already have return-to-learn guidelines in place, and some may

provide accommodations even if not suggested by medical personnel. Still, Slomine et al (14) found that the most common reason for unmet need reported by caregivers after TBI was that the service was not recommended by the physician or school. In our experience, increased parental awareness of the cognitive, behavioral, and emotional difficulties after TBI has resulted in more parents advocating for educational plans even if the plans are not suggested or offered by medical and school professionals.

The present study also examined the use of mental health services related to participation in a CAPS online problem-solving group or an IRC group. CAPS participation is beneficial in lowering executive dysfunction and externalizing symptoms in older adolescents (15,26,40) and improving global functioning over time (24). Although there were no differences in mental health care use between the CAPS group and the IRC group, adolescents in the CAPS group had significantly lower rates of impairment at 18 months post baseline than those in the IRC group. Rates of unmet need did not differ between the CAPS and IRC groups at the final assessment (58% of CAPS group vs 64% of IRC group); however, fewer CAPS participants needed services.

In conceiving this study, we were unsure whether participation in the CAPS group would be associated with more or less use of services. One could argue that the knowledge and support provided through such a group would make patients and their families more aware of TBI-related difficulties, in turn increasing use of mental health care services. Conversely, one might hypothesize that persons with more knowledge and support would seek services at a lower rate because they might anticipate difficulties and be less alarmed by subtle changes in functioning. Ready access to reassurance and support from online counselors may have assuaged concerns and decreased the likelihood of seeking services. In the present study, where use of mental health services was low in both groups, it is difficult to draw firm conclusions about the effects of treatment group participation.

Findings also revealed a trend for greater service use among older adolescents, with a 1-year increase in age associated with 1.3 odds of using mental health services. This difference by age was not related to higher rates of impairment among older adolescents but is consistent with commonly held views that middle-to-late adolescence is a particularly challenging time of development. Rates of emotional and behavioral problems are high in this age group in the general population, and having experienced TBI increases the likelihood of problems. In addition, this finding might be related to increasing developmental expectations. As cognitive demands and emotional pressures increase significantly in mid-to-late adolescence, persons who have experienced TBI may struggle to meet these demands. Older adolescents may also have greater self-awareness of deficits, making them more willing to get treatment with comparable levels of symptoms.

A number of social-demographic factors, including gender, race/ethnicity, and SES, did not predict use of mental health services in the 2 years after TBI. Our finding of comparable use regardless of SES may have been related to the inclusion criteria stipulating English as the primary language spoken in the home. In fact, 8% of potential participants were excluded for this reason. There were also few African Americans in our study, so power may have been insufficient to detect differences related to race. The lack of race-related differences in health

care use in this study might also reflect the low rates of service use by participants in general. This study also failed to find differences in the use of mental health services as a function of injury severity as defined by GCS scores and imaging findings. This finding was unanticipated, as one might expect that those with more severe injuries would have more difficulties and a greater need for services.

Limitations

Limitations in this study include the use of a sample with relatively few patients from minority groups. Our sample (80.3% white; 19.7% nonwhite) is in line with expectations for central and western regions of the United States for this study period, but we do recognize that these proportions are somewhat smaller than would be expected nationwide during the same period. Our group's median income (\$64,000) is higher than the US median income (\$51,000) during the same period. These racial and socioeconomic factors may limit the generalizability of our conclusions.

We also relied on parent report of service use, which was subject to bias and errors in recall. Reporter bias is mitigated to some extent by the use of the CAFAS to identify impairment because CAFAS ratings were made by trained raters naive to group assignment. Although we asked parents about the services that the children were receiving through school, we did not collect data directly from schools to corroborate these reports. Parent report was also used to assess adolescents' behavioral and emotional problems and difficulties in executive function, and we did not seek behavior ratings directly from teachers. We did not collect information on the rates of mental health service use before injury, which may have aided our interpretation of subsequent use. Data on use of services before injury may have helped explain the relatively low rates of service use after the injury. Because we did not inquire about reasons for unmet need, we can only speculate on why this study and others have found relatively low service use in a population with known needs.

Finally, this study focused on behavioral and emotional needs after TBI rather than on school services for cognitive or learning problems. Cognitive needs are an important area for future focus because learning difficulties and executive dysfunction are common after TBI. Cognitive needs may be harder to detect than behavioral and emotional difficulties, which are more likely to cause classroom disruption. Although participants were followed to approximately 2 years after TBI, further studies are additionally needed to better understand long-term needs related to use of mental health care services.

Conclusions

To our knowledge, this is the first study to examine the use of mental health care services in an adolescent TBI population across outpatient, inpatient, and school settings for up to 2 years after TBI. Parent ratings on behavioral measures indicated that impairments were identified in approximately half the adolescents with TBI in the first year after baseline and about one-third at a longer follow-up at 18 months post baseline. Of those who were impaired, less than half received mental health services. This gap between need and service use is consistent with findings from previous studies, although the rate of unmet need in our study was somewhat higher than has been reported by others. We found low rates of use of

school-based services even though behavioral and emotional problems are common in this group. Future studies are needed to examine barriers associated with seeking services in this population and investigate how psychoeducation may decrease or mitigate problems after TBI.

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Abbreviations

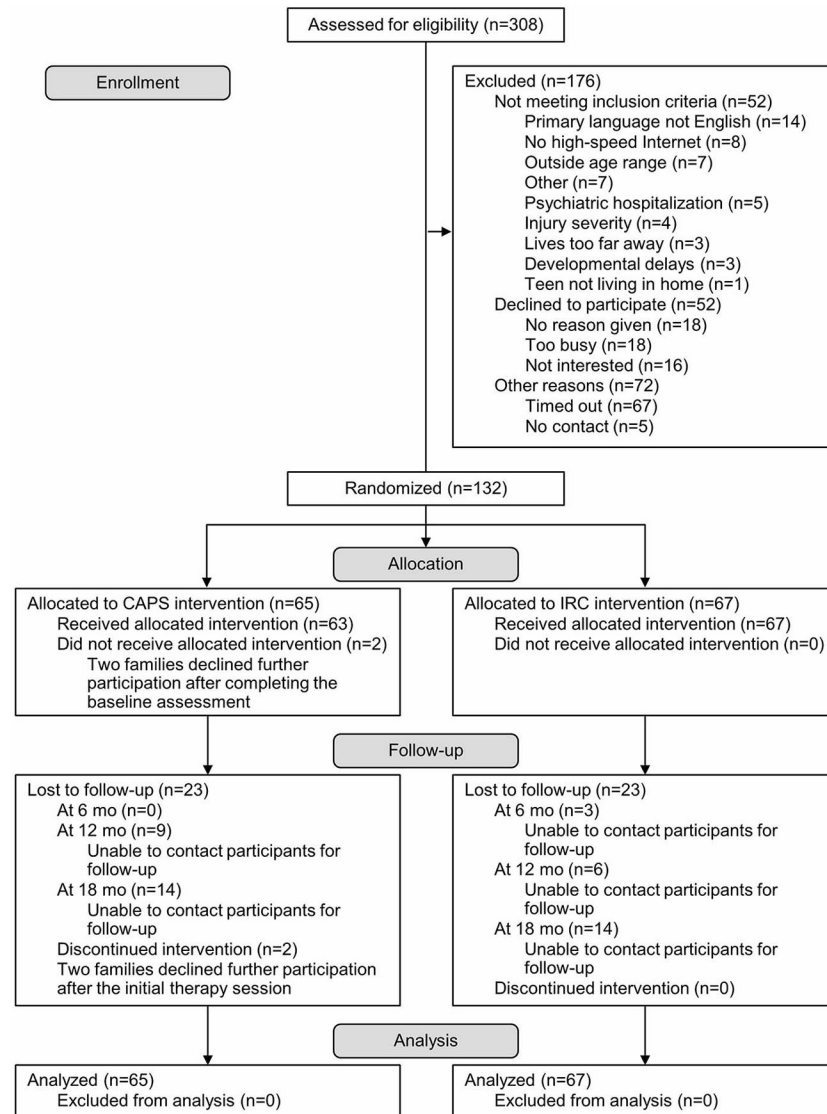
BRIEF	Behavior Rating Inventory of Executive Function
BRIEF-GE	Behavior Rating Inventory of Executive Function–Global Executive Composite
CAFAS	Child and Adolescent Functional Assessment Scale
CAPS	counselor-assisted problem-solving
CBCL	Child Behavior Checklist
GCS	Glasgow Coma Scale
GEE	generalized estimating equation
IRC	Internet resource comparison
SACA	Service Assessment for Children and Adolescents
SES	socioeconomic status
TBI	traumatic brain injury

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**Figure 1.**

Flowchart of Participants. CAPS indicates counselor-assisted problem-solving; IRC, Internet resource comparison.

Table 1

Sample Characteristics by Group at Baseline

Characteristic	CAPS (n=65)	IRC (n=67)	P Value
Participant			
Age at injury, mean (SD), y	14.4 (1.7)	14.7 (1.8)	.37
Female gender, No. (%)	21 (32.3)	25 (37.3)	.55
Race, No. (%)			.23
Nonwhite	13 (20.0)	22 (32.8)	
White	52 (80.0)	45 (67.2)	
Injury severity, No. (%)			.97
Moderate	40 (61.5)	41 (61.2)	
Severe	25 (38.5)	26 (38.8)	
Parent			
Primary caregiver education, No. (%)			.19
High school or less	26 (40.0)	33 (49.3)	
Some college	39 (60.0)	34 (50.8)	
Income, No. (%)			.41
<\$40,000	22 (33.9)	30 (44.8)	
\$40,000-\$89,999	25 (38.5)	20 (29.9)	
\$90,000	18 (27.7)	17 (25.4)	
Primary caregiver marital status, No. (%)			.44
Married or living with partner	44 (67.7)	41 (61.2)	
Not married	21 (32.3)	26 (38.8)	

Abbreviations: CAPS, counselor-assisted problem-solving; IRC, Internet resource comparison.

Table 2

Group Differences Over Time in the Proportion of Participants Using Mental Health Services

Time	CAPS, No. (%)	IRC, No. (%)	Total, No. (%)
Baseline	17 (26)	23 (35)	40 (30)
6 mo	18 (30)	20 (32)	38 (31)
12 mo	14 (28)	18 (33)	32 (28)
18 mo	10 (23)	12 (24)	22 (22)

Abbreviations: CAPS, counselor-assisted problem-solving; IRC, Internet resource comparison.

Table 3Overall Use of Mental Health Services According to Impairment by Group and Time Interval^a

		Time After Baseline, mo		
Group	Baseline	6	12	18
Not impaired				
CAPS				
Did not use services	22 (81)	27 (87)	24 (92)	27 (84)
Used services	5 (19)	4 (13)	2 (8)	5 (16)
IRC				
Did not use services	20 (87)	22 (85)	22 (81)	21 (91)
Used services	3 (13)	4 (15)	5 (19)	2 (9)
Impaired				
CAPS				
Did not use services	26 (68)	15 (52)	12 (50)	7 (58)
Used services	12 (32)	14 (48)	12 (50)	5 (42)
IRC				
Did not use services	23 (54)	20 (56)	15 (54)	18 (64)
Used services	20 (46)	16 (44)	13 (46)	10 (36)

Abbreviations: CAPS, counselor-assisted problem-solving; IRC, Internet resource comparison.

^aData are presented as No. (% of sample).

Table 4Proportion of Participants Using Mental Health Services Over Time by Impairment Group^a

Time	Not Impaired, No. (%)	Impaired, No. (%)
Baseline	8 (16)	32 (40)
6 mo	8 (14)	30 (46)
12 mo	7 (13)	25 (48)
18 mo	7 (13)	15 (38)

^a Impairment at baseline: scores ≥ 50 on the Child and Adolescent Functional Assessment Scale, ≥ 63 on the Child Behavior Checklist, or ≥ 65 on the Behavior Rating Inventory of Executive Function–Global Executive Composite.

Table 5

Demographic Variables Over Time on the Likelihood of Participants Using Mental Health Services

Model	Standard Estimate (95% CI)	P Value
Age at injury (continuous)		
Visit	0.87 (−2.03 to 3.77)	.56
Age at injury	0.24 (−0.01 to 0.49)	.06
Age at injury by visit	−0.07 (−0.26 to 0.13)	.50
Patient's race is white		
Visit	−0.54 (−1.23 to 0.14)	.12
White race	−0.32 (−1.30 to 0.66)	.52
White race by visit	0.51 (−0.26 to 1.28)	.19
SES (combined income and parental education)		
Visit	−0.09 (−0.41 to 0.24)	.60
SES	−0.26 (−0.69 to 0.18)	.25
SES by visit	0.03 (−0.29 to 0.34)	.86
IEP (preinjury)		
Visit	1.37 (−1.77 to 4.52)	.39
IEP	0.65 (−1.24 to 2.55)	.50
IEP by visit	1.74 (−3.65 to 7.14)	.53
Patient gender		
Visit	−0.13 (−0.52 to 0.27)	.53
Gender	0.12 (−0.66 to 0.92)	.77
Gender by visit	0.06 (−0.60 to 0.71)	.86

Abbreviations: IEP, Individualized Education Plan; SES, socioeconomic status.