Prevalence and Risk Factors for Posttraumatic Stress Disorder Among Chemically Dependent Adolescents

Eva Y. Deykin, Dr.P.H., and Stephen L. Buka, Sc.D.

Objective: This study ascertained the prevalence of posttraumatic stress disorder (PTSD) among chemically dependent adolescents and identified factors that influence the risk of PTSD after a qualifying trauma. Method: The study group consisted of 297 adolescents aged 15–19 years who met the DSM-III-R criteria for dependence on alcohol or other drugs and who were receiving treatment in seven publicly funded Massachusetts facilities. PTSD and other axis I diagnoses were assessed by the Diagnostic Interview Schedule. Data on risk factors were collected by a specially constructed interview schedule. Results: The lifetime prevalence of PTSD was 29.6% (24.3% for males and 45.3% for females), and the current prevalence was 19.2% (12.2% for males and 40.0% for females). These prevalences reflect a high occurrence of traumatic exposures and a high case rate among those who experienced trauma. The risk of PTSD varied with the nature of the trauma, the number of traumas experienced, psychiatric comorbidity, and familial characteristics. The higher rate of PTSD among females was due to a greater frequency of rape, which carries a high risk of PTSD development, and to a high rate of comorbid conditions. Conclusions: The lifetime prevalence of PTSD among these chemically dependent adolescents is five times that reported for a community sample of adolescents. This extremely high rate provides new understanding of the etiologic connection between PTSD and chemical dependence and has implications for their treatment.

(Am J Psychiatry 1997; 154:752–757)

Posttraumatic stress disorder (PTSD) has long been recognized as a consequence of battle situations (1–3). Research on PTSD in civilian populations (4–6) was sparked by its designation in DSM-III as a psychiatric disorder. According to the DSM-III-R criteria, PTSD, which is triggered by a severe trauma "outside the normal range of human experience," is characterized by persistent, intrusive flashbacks to the trauma; numbing of responsiveness; and persistent states of increased arousal. In DSM-IV the criteria for PTSD have been modified so that the initiating trauma needs only to be one that involves a threat to physical integrity. The ensuing symptoms must have lasted at least 1 month after the traumatic event. PTSD differs from nonpathologic responses to trauma by its intensity, duration, and level of impaired functioning.

In an early study of civilians, Helzer et al. (4) used Epidemiologic Catchment Area survey data to estimate the lifetime prevalence of PTSD among adults, which was found to be 1% for both genders combined (0.5% for males and 1.3% for females). A subsequent study by Breslau et al. (5) showed that the lifetime prevalence of PTSD among young adults enrolled in a Detroit health maintenance organization was 9.2%, or nine times that found by Helzer et al. Breslau et al. also reported that specific personal characteristics influenced the probability of both the occurrence of trauma and the development of PTSD after the trauma. Male gender, low educational attainment, prior conduct problems, extroversion, and a familial history of psychiatric disorders and/or substance abuse enhanced the risk of experiencing a trauma. The probability of PTSD was increased by concurrent psychiatric morbidity, early separation from parents, and a family history of anxiety. In a separate investigation, Giaconia et al. (7) found that in a community sample of adolescents the lifetime prevalence of PTSD was 6.3%, a frequency lower than, but consistent with, that found by Breslau et al. when the age difference of the two samples is taken into account. The discrepancy in the PTSD prevalence estimates among the studies by Helzer et al., Breslau et al.,

Received April 1, 1996; revision received Dec. 17, 1996; accepted Jan. 23, 1997. From the Department of Psychiatry, Harvard Medical School, and the Department of Maternal and Child Health, Harvard School of Public Health, Boston; and the National Center for Post Traumatic Stress Disorders, Boston VA Medical Center. Address reprint requests to Dr. Deykin, National Center for Post Traumatic Stress Disorders, B12-49a, Boston VA Medical Center, 150 South Huntington Ave., Boston, MA 02130; Deykin.Eva_Y@Boston.VA.-Gov or Dandeykin@aol.com (e-mail).

Supported in part by grant DA-05834 from the National Institute on Drug Abuse and grant 86-1079-86 from the William T. Grant Foundation.

The authors thank Tim Zeena, Anne Dineen, Jeanne Murphy, and Kim Kelley for research assistance.

and Giaconia et al. is not likely to be due to methodologic differences, as all used the National Institute of Mental Health Diagnostic Interview Schedule (DIS) (8) to collect data and all studied nonclinical samples. Prevalence rates similar to those reported by Breslau et al. and Giaconia et al. were found by Kessler et al. (9), who assessed lifetime PTSD prevalence in a representative national sample of 5,877 individuals and reported prevalences of 2.8% and 10.3% for males and females aged 15–24 years, respectively.

Interest in PTSD has also expanded to populations of children, sparked partly by the seminal work of Terr (10, 11) and by increased recognition that extreme forms of child abuse constitute trauma. Studies among children have focused on populations subjected to natural disasters (12, 13), war (14), child maltreatment (15, 16), and other man-made events (17). The data suggest that even among young children, a syndrome that meets the DSM criteria for PTSD can occur.

To better understand this syndrome, its prevalence, and risk factors, we investigated a population that is likely to have experienced a high number of qualifying trauma. We focused on a group of 297 chemically dependent adolescents. As substance dependence often involves chaotic and violent lifestyles, it is possible that such youth are at greater risk of experiencing events that qualify as trauma "beyond normal human experience." This study group may thus provide more information on the features that increase the risk of this disorder. The goals of this study were to assess the absolute prevalence of PTSD among chemically dependent adolescents and its prevalence relative to other psychiatric disorders; to identify variates that appear to increase the risk of PTSD among traumatized subjects; to ascertain whether the risk of PTSD differs according to the type of trauma experienced; and to examine the temporal sequence of PTSD and the onset of substance dependence.

METHOD

The study group consisted of 297 adolescents aged 15 to 19 years who met the full DSM-III-R criteria for dependence on alcohol and/or other drugs. The subjects, recruited from seven of eight possible residential substance abuse treatment centers in Massachusetts, constituted 81.4% of 365 study-eligible subjects. Of the 365 potential subjects, 65 refused to participate in the study, and three who had agreed refused to answer questions on trauma experience. We compared the age, sex, and race distributions of the enrolled subjects with those of the nonparticipants and found no significant differences between the two groups.

The source treatment facilities were designed for adolescent substance abusers, and all had service contracts with Massachusetts public agencies. The eighth facility elected not to participate, but as the participating sites accepted adolescents from all parts of Massachusetts, the study group is representative of severe substance-abusing adolescents receiving residential treatment in the public sector.

The subjects were enrolled between the 2nd and 4th weeks after their treatment admissions. Study participation involved willingness to undergo a diagnostic interview and to complete various self-report instruments. After complete description of the study to the subjects, written informed consent was obtained. The institutional review board of the Harvard School of Public Health and the authorities at the treatment sites approved the study protocol, the manner in which we obtained informed consent, and the methods of data collection.

Data were gathered by means of two instruments: the DIS (8) and the Family and Social Form. The DIS is a structured interview obtaining data on symptoms and behaviors linked to DSM diagnostic classifications. We used the DIS-III-R version, which elicited data leading to the establishment of 11 DSM-III-R axis I psychiatric disorders. The Family and Social History Form is a structured interview we developed to obtain factual information on family composition, school performance, and familial substance use and mental and physical illnesses.

The interviewers were college graduates who had previously worked with adolescents. The interview training consisted of 2 weeks' classroom instruction on the structure and content of the instruments and how to conduct interviews and code responses. We provided instruction on the logic of the DIS-III-R, on its flow chart, and on whether endorsed symptoms were sufficient in nature, number, persistence, and severity to warrant a DSM-III-R diagnosis. We supervised mock interviews and data coding. After the classroom training, the interviewers conducted several live interviews under supervision. To ensure continued consistency in interviewing and coding, each interviewer tape-recorded a current interview at regular intervals. These interviews and their accompanying coding were jointly reviewed, allowing us to determine whether the coded data accurately reflected the content of the interview. The interviews were checked for blanks and inconsistencies before the data were entered into the computer by using the Paradox data-entry system.

Data from the DIS-III-R interviews were scored by a personal computer program we developed (a copy of the software may be obtained by writing to Lee Robins, Ph.D., Department of Psychiatry, Washington University, St. Louis, MO 63110). This program matched the scoring algorithm developed for mainframe computers, resulting in the same diagnostic classifications. SAS programming (18) was used for all data analyses.

RESULTS

Subject Characteristics

The study group comprised 75 females and 222 males. All subjects met the full criteria for dependence on alcohol, other drugs, or both. Most met the DSM-III-R criteria for dependence on both alcohol and at least one illicit drug (table 1). Marijuana was the illicit drug most commonly used, followed by cocaine and LSD. The data in table 1 indicate that a large proportion of the study group came from families that had received public welfare benefits. However, according to the Hollingshead Four Factor Index (19), which uses parental education and occupation as markers of social class, 72.1% of the males (N=160) and 80.0% of the females (N=60) came from middle-class families. The disparity between estimated social class and the high proportion of families receiving welfare benefits suggests that the subjects' families had financial difficulties despite adequate education and occupations. The high prevalence of substance abuse among the subjects' parents (table 1) could explain this discrepancy.

The male and female subjects were similar on most social and demographic characteristics. However, the males as a group were significantly older (mean age= 16.6 years, SD=1.1) than the females (mean age=16.2, SD=0.9) ($t=0.002$, $df=295$, $p<0.01$), and significantly more of the males were 2 or more years below appropriate grade level or had been incarcerated or arrested

TABLE 1. Sociodemographic Characteristics of 297 Male and Female Chemically Dependent Adolescents

Characteristic	Males (N=222) N	Males (N=222) %	Females (N=75) N	Females (N=75) %	Analysis χ^2 (df=1)	Analysis p
White	184	82.9	61	81.3	0.09	n.s.
Below appropriate grade by ≥2 years	71	32.0	15	20.0	3.91	0.04
History of arrests[a]	114	87.7	26	56.5	20.30	<0.001
Type of chemical dependence (DSM-III-R)						
Alcohol only	9	4.1	9	12.0	—	—
Drugs only	12	5.4	8	10.7	—	—
Drugs and alcohol	201	90.5	58	77.3	9.27	0.01
History of suicide attempt	62	27.9	45	60.0	25.75	<0.001
History of childhood victimization[b]	88	39.6	62	82.7	41.52	<0.001
Family had received public welfare benefits[c]	126	58.6	49	69.0	2.44	n.s.
Either parent had received mental health treatment[c]	89	42.0	48	65.8	13.82	<0.001
Either parent had been treated for alcohol abuse[c]	151	69.9	56	75.7	0.90	n.s.
Either parent had been treated for drug abuse[c]	103	47.2	35	48.6	0.04	n.s.

[a]Arrest history was not elicited from the initial group of subjects; data based on only 176 subjects.
[b]Victimization deemed positive either by history of physical/sexual abuse or by history of child abuse report to Massachusetts Department of Social Services.
[c]Data not available for all subjects.

TABLE 2. Risk of PTSD Following Specific Traumas for Male (N=222) and Female (N=75) Chemically Dependent Adolescents

Trauma	Exposed	PTSD N	PTSD %	Odds Ratio[a]	95% Confidence Interval
Rape					
Males	8	6	75.0		
Females	30	23	76.7	1.1	0.2–6.9
Physical assault					
Males	35	9	25.7		
Females	17	7	41.2	2.0	0.6–6.9
Seeing someone hurt or killed					
Males	79	19	24.1		
Females	27	13	48.1	2.9	1.2–7.2
Threat of injury					
Males	47	8	17.0		
Females	11	4	36.4	2.8	0.7–11.5
Narrow escape					
Males	15	2	13.3		
Females	3	2	66.7	13.0	1.0–166.5
Sudden injury or accident					
Males	45	8	17.8		
Females	6	1	16.7	0.9	0.1–9.2
News of sudden injury or death					
Males	12	4	33.3		
Females	10	4	40.0	1.3	0.2–7.9
Other trauma					
Males	8	3	37.5		
Females	5	3	60.0	2.5	0.2–26.5
Any trauma					
Males	162	54	33.3		
Females	60	34	56.7	3.7	2.0–6.8

[a]Relative to risk for males.

(table 1). Significantly more of the females reported a suicide attempt, recalled childhood physical or sexual abuse and/or a history of a filed report of abuse to the Massachusetts Department of Social Services, or had a parent who had received mental health treatment (table 1).

Prevalence of PTSD

The lifetime prevalence of PTSD was 29.6% overall (N=88), 24.3% for the males (N=54) and 45.3% for the females (N=34). The current prevalence, defined as within the past 4 weeks, was 19.2% (N=57), 12.2% for the males (N=27) and 40.0% for the females (N=30). For the entire group overall and for the females specifically, PTSD was the most common diagnosis in terms of both lifetime and current prevalence, taking precedence over major depression, dysthymia, simple phobia, and bulimia. Among the males, PTSD ranked as the second most common disorder, preceded only by simple phobia.

Rates of exposure to specific traumas are shown in table 2. Overall, trauma was reported by 222 (74.7%) of the subjects. The females were somewhat more likely than the males to have experienced a trauma (80.0% versus 73.0%). Rape, seeing someone hurt or killed, physical assault, and threat of injury were the most common trauma for the females. Among males, seeing someone hurt or killed, threat of injury, and sudden injury or accident were the most frequent traumatic events. The data in table 2 suggest that the risk of developing PTSD after a trauma varies both by gender and by the type of trauma experienced. Overall, the probability of developing PTSD was 41.6%, and the risk for females was 1.7 times as high as that for males (table 2). However, the female-male risk ratio varied considerably depending on the nature of the trauma. For rape, females and males had the same probability of developing PTSD, while after seeing someone hurt or killed the females were twice as likely to develop PTSD. This variability in the risk of PTSD by trauma type could explain the overall difference in rates of PTSD between the males and females in this study group. The females were 11.1 times as likely as the males to have been raped, while the males were 2.5 times as likely to have experienced a sudden injury or accident, a traumatic experience with a low PTSD risk.

The number of traumas experienced also influenced the probability of PTSD. The data in table 3 show a significant increase in the risk of PTSD with multiple trauma for the study group as a whole (χ^2=11.46, df=2,

p=0.001). The increase in PTSD risk with increasing number of traumas was also significant for the males (χ^2=8.88, df=2, p=0.005). The females did not have a significant risk increase (χ^2=0.47, df=2, p=0.49). These findings suggest that PTSD development depends both on the nature and number of trauma exposures. Since males are more commonly exposed to lower-risk trauma, the impact of multiple traumas is more evident for males than for females, who, exposed to high-risk trauma such as rape, develop PTSD with fewer traumatic exposures.

We examined the temporal sequence of the first episode of PTSD and the beginning of chemical dependence (either alcohol or other drugs) by comparing the ages at onset for the two conditions. Age at onset was established in the following manner: for each symptom or behavior endorsed, the subject also reported the age at earliest occurrence. The age at onset for each disorder was calculated by a DIS algorithm that determined the earliest age at which the criterion set of symptoms occurred. The subjects provided information only on whether they had experienced a given symptom and, if so, at what age. They were not asked to recall whether their substance dependence preceded or followed PTSD. For the entire study group, the onsets of chemical dependence and PTSD were intertwined. However, more of the females (58.8%, 20 of 34) than males (27.8%, 15 of 54) had experienced PTSD before chemical dependence. The males were 1.4 times as likely to have experienced PTSD after the onset of chemical dependence. The average age at the onset of chemical dependence was 12.7 years for the males (SD=1.8) and 13.4 years for the females (SD=1.3). However, the mean age at the onset of PTSD was 11.5 years (SD=4.2) for the females and 13.5 years (SD=4.4) for the males.

Since the studies of both Breslau et al. (5) and Giaconia et al. (7) showed that the risk of PTSD is enhanced by comorbidity, we assessed whether PTSD was more common among subjects with concurrent psychiatric disorders. The data in table 4 indicate that the subjects who had experienced a trauma without subsequent PTSD had only a marginal excess risk of comorbidity and a somewhat higher average number of comorbid conditions. However, for the subjects who developed PTSD, the probability of comorbidity was significantly higher than that of the subjects without any trauma, and the average number of diagnoses was almost three times as high. This suggests that psychiatric comorbidity is an important facilitator of PTSD but does not increase the risk of traumatic exposures.

TABLE 3. Relation Between Number of Traumas and Risk of PTSD for Male and Female Chemically Dependent Adolescents

	PTSD	
Number of Experienced Traumas	N	%
One		
Total group (N=110)	36	32.7
Males (N=89)	24	27.0
Females (N=21)	12	57.1
Two		
Total group (N=76)	34	44.7
Males (N=49)	15	30.6
Females (N=27)	19	70.4
Three		
Total group (N=36)	23	63.9
Males (N=24)	15	62.5
Females (N=12)	8	66.7

TABLE 4. Relation of Comorbid Psychiatric Diagnoses to History of Trauma and Development of PTSD for 297 Male and Female Chemically Dependent Adolescents

	Comorbid Psychiatric Disorder[a] Present						
						Number of Diagnoses	
History of Trauma and PTSD	N	%	Odds Ratio	Confidence Interval	p	Mean	SD
No history of trauma							
Total group (N=75)	28	37.3				0.71	1.30
Males (N=60)	21	35.0				0.50	0.79
Females (N=15)	7	46.7				1.53	2.32
History of trauma							
PTSD absent							
Total group (N=129)	64	49.6	1.65	0.92–3.00	0.09	0.81	1.05
Males (N=108)	53	49.1	1.79	0.93–3.43	0.08	0.72	0.95
Females (N=21)	11	52.4	1.26	0.33–4.74	0.74	1.24	1.45
PTSD present							
Total group (N=93)	76	81.7	7.50	3.71–15.17	0.001	2.04	1.74
Males (N=54)	40	74.1	5.31	2.37–11.90	0.001	1.44	1.38
Females (N=39)	36	92.3	13.71	2.90–64.90	0.001	2.87	1.87

[a]DSM-III-R axis I diagnoses exclusive of PTSD and alcohol or drug abuse or dependence.

Last, we assessed whether trauma with or without subsequent PTSD might be associated with specific personal, social, and familial variables. Family receipt of public welfare benefits, paternal alcohol abuse, and maternal psychopathology significantly increased the risk of trauma (data not shown) but did not increase PTSD risk. Among the subjects with a history of trauma, heightened probability of PTSD was seen for those who reported drug-abusing mothers or fathers who had received treatment for mental health problems. Males whose mothers had received mental health treatment were also at greater risk of PTSD after traumatic experiences. It appears that the familial characteristics that facilitate exposure to trauma differ from those that enhance the development of PTSD.

DISCUSSION

In a group of 297 adolescents undergoing residential treatment for dependence on alcohol or other drugs, we found a 29.6% lifetime prevalence of PTSD, which is

five times that reported by Giaconia et al. (7) for a community sample of comparably aged adolescents. Since the DIS was the instrument of data collection in both studies, it is unlikely that the disparity in estimated prevalence of PTSD is due to differences in data collection or diagnostic definitions. However, our enrollment of a clinical sample may contribute to the observed high prevalence of PTSD. As Berkson (20) has shown, persons receiving treatment are more likely to exhibit comorbidity than untreated persons with the same condition, since help seeking is influenced by the total discomfort or pain a person experiences. Thus, the unusually high prevalence of PTSD found in our referred subjects may not be generalizable to populations of untreated chemically dependent adolescents. There are two other possible explanations for the high prevalence of PTSD in our study. First, the 74.4% rate of trauma exposures is almost twice the 39.1% trauma rate reported by Breslau et al. (5) and the 43.0% found by Giaconia et al. (7). Second, the 41.6% rate of PTSD occurrence among our traumatized subjects is two to three times the 23.6% and 14.5% PTSD rates reported by Breslau et al. and Giaconia et al., respectively. Our findings suggest that the prevalence of PTSD in this group is due both to a higher risk of trauma and to greater susceptibility to PTSD after a trauma. It is possible that excessive use of alcohol and/or other drugs may facilitate exposure to severe and repeated trauma and may diminish a person's ability to marshal emotional resources to cope with trauma effectively. The high trauma rate can partly be attributed to the degree of interpersonal violence in environments where drug dealing is common. The large proportion of subjects with a history of arrests or incarcerations shown in table 1 supports this possibility. However, the high trauma rate alone does not explain the subsequent high case rate. Rather, the data presented in table 4 confirm the reports by Breslau et al. and Giaconia et al. that psychiatric comorbidity increases PTSD susceptibility. Our study also showed a high degree of psychiatric comorbidity among subjects with PTSD. However, the temporal relationship of PTSD and other psychiatric disorders needs further study before it can be determined which conditions are primary. If psychiatric comorbidity both enhances vulnerability to PTSD and leads to heavy substance use as a way of self-medicating painful feeling states, then this may account for the high prevalence of PTSD observed among these chemically dependent adolescents.

Two important gender differences emerged in this study. First, because females have a greater probability of rape, the highest-risk trauma, they have a higher risk of PTSD simply from such exposures. However, since the female subjects in this study had more psychiatric comorbidity than the males, they also had a greater vulnerability to PTSD irrespective of the type of traumatic exposures.

The second gender difference relates to the temporal sequence of PTSD and substance dependence. Data on the nature, severity, and duration of individual symptoms and on age at their first occurrence were based on the subjects' retrospective recall. We found that among the males, chemical dependence was well established before the onset of PTSD, while the reverse was found for the females. As with all retrospective recall, the possibility of distortion and inaccuracy exists. However, this gender difference with respect to the temporal sequence of the two disorders is entirely concordant with findings from an investigation of major depressive disorder and substance dependence (21). In that study also we found that males who meet the criteria for major depressive disorder became depressed after the development of chemical dependence. Conversely, depressed females tended to become depressed before becoming substance dependent. The consistency of these findings implies that severe substance abuse differs in pathogenesis between the two genders. In females, chemical dependence may be secondary, resulting from repeated substance use to deaden the psychic discomfort of PTSD. Among males, substance dependence appears to be the primary disorder, leading to behaviors and interactions in which trauma are likely.

The high rate of PTSD in this clinical sample underscores the need to assess the presence of PTSD among adolescents presenting for substance abuse treatment. Our findings strongly suggest that these youth bear a heavy burden of psychiatric comorbidity that, if unrecognized, could impede treatment. These findings not only shed some light on the evolution of PTSD and its association with severe substance use, but may also have valuable clinical implications. Clinicians should be aware that in planning treatment for substance-abusing adolescents, it is important to determine whether PTSD is part of the clinical picture and, if so, whether it is primary or secondary to substance abuse. Objective corroboratory information on the sequence of the two conditions should be sought in order to determine the most appropriate treatment strategy. For those whose chemical dependence preceded PTSD, the primary concern might be to address substance use first since if untreated, it will continue to facilitate additional traumatic exposures. Conversely, for those whose alcohol or drug use is secondary to PTSD, and may thus be a means of medicating painful states, therapy might well be focused on reducing the symptoms of PTSD.

Last, we caution that the results of this investigation may not be generalizable to all chemically dependent adolescents. The high prevalence of PTSD we found may be due to the clinical sample studied, to the relatively long duration of chemical dependence, or to the specific social-demographic characteristics of this group of subjects.

REFERENCES

1. Yager J: Postcombat violent behavior in psychiatrically maladjusting soldiers. Arch Gen Psychiatry 1976; 33:1332–1335
2. Escobar JI, Randolph ET, Puente G, Spiwak F, Asamen JK, Hill M, Hough RL: Post-traumatic stress disorder in Hispanic Vietnam veterans: clinical phenomenology and sociocultural characteristics. J Nerv Ment Dis 1983; 171:585–596

3. Kramer TL, Lindy JD, Green BL, Grace MC, Leonard AC: The comorbidity of post-traumatic stress disorder and suicidality in Vietnam veterans. Suicide Life Threat Behav 1994; 24:58–67
4. Helzer JE, Robins LN, McEvoy L: Post-traumatic stress disorder in the general population: findings of the Epidemiologic Catchment Area survey. N Engl J Med 1987; 317:1630–1634
5. Breslau N, Davis GC, Andreski P, Peterson E: Traumatic events and posttraumatic stress disorder in an urban population of young adults. Arch Gen Psychiatry 1991; 48:216–222
6. Kilpatrick DG, Resnick HS: Posttraumatic stress disorder associated with exposure to criminal victimization in clinical and community populations, in Posttraumatic Stress Disorder: DSM-IV and Beyond. Edited by Davidson JRT, Foa EB. Washington, DC, American Psychiatric Press, 1993, pp 99–143
7. Giaconia RM, Reinherz HZ, Silverman AB, Pakiz B, Frost AK, Cohen E: Traumas and posttraumatic stress disorder in a community population of older adolescents. J Am Acad Child Adolesc Psychiatry 1995; 34:1369–1379
8. Robins LN, Helzer JE, Croughan J, Ratcliff KS: The National Institute of Mental Health Diagnostic Interview Schedule: its history, characteristics, and validity. Arch Gen Psychiatry 1981; 38: 381–389
9. Kessler RC, Sonnega A, Bromet E, Hughes M, Nelson CB: Posttraumatic stress disorder in the National Comorbidity Survey. Arch Gen Psychiatry 1995; 52:1048–1060
10. Terr LC: Psychic trauma in children: observations following the Chowchilla school-bus kidnapping. Am J Psychiatry 1981; 138: 14–19
11. Terr LC: Psychic trauma in children and adolescents. Psychiatr Clin North Am 1985; 8:815–831
12. Pynoos RS, Goenjian A, Tashjian M, Karakashian M, Manjikian R, Manoukian G, Steinberg AM, Fairbanks LA: Post-traumatic stress reactions in children after the 1988 Armenian earthquake. Br J Psychiatry 1993; 153:239–247
13. Shannon MP, Lonigan CJ, Finch AJ Jr, Taylor CM: Children exposed to disaster, I: epidemiology of post-traumatic symptoms and symptom profiles. J Am Acad Child Adolesc Psychiatry 1994; 33:80–93
14. Dreman S: Children of victims of terrorism in Israel: coping and adjustment in the face of trauma. Isr J Psychiatry Relat Sci 1989; 26:212–222
15. McLeer SV, Debbinger E, Atkins MS, Foa EB, Ralphe DL: Posttraumatic stress disorder in sexually abused children. Am J Child Adolesc Psychiatry 1988; 5:650–654
16. McLeer SV, Callaghan M, Henry D, Wallen J: Psychiatric disorders in sexually abused children. J Am Acad Child Adolesc Psychiatry 1994; 33:313–319
17. Pynoos RS, Frederick C, Nader D, Arroyo W, Steinberg A, Pencer E, Nunez F, Fairbanks L: Life threat and posttraumatic stress in school-age children. Arch Gen Psychiatry 1987; 44: 1057–1063
18. SAS/STAT User's Guide, version 6.03. Cary, NC, SAS Institute, 1991
19. Hollingshead AB: Four-Factor Index of Social Status. New Haven, Conn, Yale University, Department of Sociology, 1975
20. Berkson J: Limitations of the application of fourfold table analysis to hospital data. Biometrics Bulletin 1946; 2:47–53
21. Deykin EY, Buka SL, Zeena TH: Depressive illness among chemically dependent adolescents. Am J Psychiatry 1992; 149: 1341–1347