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Chronic PTSD in Vietnam Combat Veterans: Course of Illness and Substance Abuse

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Objective: *The purpose of this study was to measure the longitudinal course of specific symptoms of posttraumatic stress disorder (PTSD) and related symptoms of alcohol and substance abuse and the effects of alcohol and substances on the symptoms of PTSD.* *Method:* *A structured interview for the assessment of PTSD and alcohol and substance abuse, as well as other factors such as life stressors and treatment, was administered to 61 Vietnam combat veterans with PTSD.* *Results:* *Onset of symptoms typically occurred at the time of exposure to combat trauma in Vietnam and increased rapidly during the first few years after the war. Symptoms plateaued within a few years after the war, following which the disorder became chronic and unremitting. Hyperarousal symptoms such as feeling on guard and feeling easily startled developed first, followed by avoidant symptoms and finally by symptoms from the intrusive cluster. The onset of alcohol and substance abuse typically was associated with the onset of symptoms of PTSD, and the increase in use paralleled the increase of symptoms. Patients reported a tendency for alcohol, marijuana, heroin, and benzodiazepines to make PTSD symptoms better, while cocaine made symptoms in the hyperarousal category worse. There was no relationship between treatment interventions and the natural course of PTSD.* *Conclusions:* *These findings suggest that symptoms of PTSD begin soon after exposure to trauma, that hyperarousal symptoms are the first symptoms to occur, that the natural course of alcohol and substance abuse parallels that of PTSD, and that specific substances have specific effects on PTSD symptoms.*

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More than 20 years after the conflict in Vietnam, considerable controversy exists about the natural history of combat-related posttraumatic stress disorder (PTSD) (1). This is largely related to the absence of empirical studies on the longitudinal course of PTSD. A few studies have looked descriptively at traumatized individuals at two or more separate time points after their exposure to psychological trauma. Thygesen et al. (2) examined Danish survivors of the German concentration camps of World War II seeking compensation at the time of their repatriation and at follow-up intervals for up to 20 years after repatriation. They found that about 68% of survivors had some form of disability 2 years after repatriation and that there was a gradual increase in the degree of disability over time after repatriation. Symptoms that led to disability included those currently described as posttraumatic stress symptoms, as well as panic attacks, deficits in memory and cognitive performance, and alcoholism. In another descriptive review of Danish survivors of the concentration camps, the authors found the majority of survivors suffering from psychiatric symptoms several years after repatriation. In examining the longitudinal course of the illness, the authors noted that one-fifth of the patients had a period of 6 months or so of "latency" during which they were able to work, and three of 40 were apparently symptom free for 12 months or more (3). Retrospective studies of the course of illness in American World War II prisoners of war (POWs) have shown a 50% rate of PTSD, according to DSM-III criteria, 1 year after repatriation and 29% 40 years after repatriation (4). In contrast, 23.4% of Vietnam combat theater U.S. Air Force POWs received a psychiatric diagnosis at repatriation, and 24.9% received a psychiatric diagnosis at 5-year follow-up (5). In a study of the course of illness in World War II POWs with the retrospectively assigned (at repatriation) diagnosis of PTSD, 36 of 188 were found to have made a "virtually complete recov-

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ery" from PTSD, and 89 of 188 were found to have mild to marked chronic PTSD at 40-year follow-up (6).

These studies have been replicated in other combat and civilian populations. The National Vietnam Veterans Readjustment Study retrospectively examined symptoms in the year following the Vietnam War and currently and found a 30% prevalence of PTSD in the year after the war and a 15% current prevalence of PTSD in Vietnam combat veterans (7). Mellman et al. (8), examining the longitudinal course of the onset of psychiatric disorders in Vietnam combat veterans seeking psychiatric treatment, found that PTSD was the most common disorder, although there was a high rate of comorbidity. PTSD was the first disorder to develop after the war in most patients, followed soon after by generalized anxiety disorder and alcoholism, and later by phobias, depression, and panic disorder. Davidson et al. (9) also found this temporal sequence of development of psychiatric disorders following combat trauma. Desert Storm veterans have been found to have an increase in posttraumatic stress symptom severity from 1 month to 6 months after returning from the Persian Gulf, with symptoms of hyperarousal more severe initially than reexperiencing and avoidance (10). In a study of firefighters involved in an Australian bushfire disaster, psychiatric symptoms present at the 4-month follow-up period were likely to persist into the 8-month follow-up period (11), which suggests a chronicity of the disorder once symptoms had been established (12). A study of Cambodian refugees with assessments performed at three time points over 7 years is also consistent with the idea that PTSD symptoms have a remarkable chronicity over time (13, 14). Retrospective studies to date, however, have not examined individual posttraumatic stress symptoms at multiple time points after exposure to trauma, and the few prospective studies performed have not included baseline assessments of symptoms before exposure to a traumatic stressor.

At the present time there have been no prospective longitudinal studies of the natural course of PTSD with baseline assessments before exposure to the traumatic stressor. Although prospective longitudinal studies are the best method for studying the natural course of a disorder, because of the difficulty of obtaining assessments of individuals before and after exposure to a traumatic stressor, it is unclear whether such studies will ever be performed. In the absence of prospective longitudinal studies with baseline assessments before exposure to trauma, the best method of obtaining information about the natural course of PTSD is with the retrospective longitudinal study. In addition, to our knowledge, no studies have examined the longitudinal course of substance use, including alcohol, marijuana, and opiates, the use of which has been shown to be greater in patients with PTSD related to combat (7, 15–19) and civilian (20) trauma; however, a study by Boscarino (21) did not confirm these findings. Hypotheses about self-medication of PTSD symptoms with alcohol and substances (22) compared to other etiologies such as genetic constitution (23) are essentially untested. The purpose of this study was to examine the longitudinal course of PTSD symptoms in Vietnam combat veterans with chronic PTSD over the 20 or more years since the time of the war. It is to be understood that there is evidence that there are at least as many patients who develop PTSD in response to a psychological trauma that resolves some time within a few years of the trauma as there are patients who develop chronic symptoms of PTSD that persist for many years; the current study was designed to provide information only about the latter group of patients. This study also examined the natural course of alcohol and substance abuse since the time of the war, the relationship between alcohol and substance abuse and PTSD symptoms, and patients' perceptions of the effects of alcohol and substances on their PTSD symptoms.

METHOD

Patients

The patients were 61 Vietnam combat veterans at the West Haven Veterans Administration Medical Center. The patients were 61 of 63 subjects consecutively admitted to a specialized inpatient cohort program for the treatment of combat-related PTSD at the National Center for PTSD over an 18-month period. Patients were admitted to this program on a voluntary basis, and patients who were in crisis or clinically unstable were not eligible for admission. Included in the study were those with a history of combat exposure, defined as having received hostile or friendly fire or having received incoming artillery rounds. Patients with a history of schizophrenia or organic brain syndrome were excluded from the study. All subjects had been free from alcohol and substances for 1 month or more, as verified by toxicology screens, and had gone through a medication washout period before the study. Two patients did not complete the major part of the interview and were not included in the study. The mean age of the patients was 45.4 years (SD=2.4), and of the 61 patients, 56 (92%) were white, three (5%) were black, and two (3%) were Hispanic. Comorbidity for other psychiatric diagnoses, based on the Structured Clinical Interview for DSM-III-R (24), are reported in table 1.

Patients were evaluated with the Mississippi Scale for Combat-Related Posttraumatic Stress Disorder (25), a measure of current PTSD symptom severity. This scale assesses the full range of PTSD symptoms and quantifies scope and severity of symptoms. The mean score on the scale in this group was 133.1 (SD=18.2). Patients were also evaluated with the Combat Exposure Scale, a validated measure of level of combat exposure in Vietnam (26). History of combat exposure was established with the Combat Exposure Scale, and verification of Vietnam combat status was established with the DD214 form (a document that lists dates and theater of service and other information and that is an official record of the military). Diagnoses of PTSD were based on the Structured Clinical Interview for DSM-III-R (when available), consensus diagnosis of two or more psychiatrists, and a score greater than 108 on the Mississippi Scale for Combat-Related Posttraumatic Stress Disorder. Written informed consent was obtained from all patients.

Longitudinal Assessment of Symptoms

PTSD symptoms, substance abuse, and other factors of interest were evaluated over time with the Longitudinal History for Vietnam Veterans Interview. The longitudinal history was designed for the purposes of this study and retrospectively evaluates the longitudinal course of PTSD and the course of alcohol and substance abuse over time. The format of the longitudinal history is similar to that of an instrument described previously for use in the study of the natural history of panic disorder (27) and involved a retrospective reconstruction of life events in order to aid the subject in recall of symptoms as well as patterns of substance abuse. For this purpose, subjects are first instructed to construct a lifeline with the assistance of the interviewer.

This consists of a line with a series of spaced marks that represent the years from 1962 until 1992. The interviewer then reads through a list of major life events that include marriages, divorces, birth of children, and year the subject went to Vietnam and returned home. A mark is then made on the lifeline next to the year in which each event occurred. The lifeline is then used to facilitate memory for symptom severity in the past by using techniques such as instructing the subject to "think about the first year you were married; how much were you bothered by symptoms of intrusive memories then?" The lifeline was used to provide anchor points for the retrospective assessment of symptoms and substance abuse at a succession of 2-year intervals starting 2 years before the year of the combat tour. The last year during which the subject was in combat in Vietnam was defined as the year of the combat tour.

At each of the 2-year intervals subjects were evaluated for PTSD symptoms and substance abuse. Each of the 16 symptoms of PTSD was evaluated by means of a scale of symptom severity (scored 0–4), introduced by the question "How much did that symptom bother you at that time (0=not at all, 1=slightly, 2=moderately, 3=considerably, 4=extremely)." For the purposes of dividing patients into groups of those with and without symptoms, a symptom severity of "moderately" or above was defined as presence of the symptom and "slightly" or below as absence of the symptom. Subjects were prompted with a list of "definition of symptoms," which entailed a layman's description of each symptom that could be used during the interview. Subjects were also asked which symptoms were the first to develop, the second to develop, and the third to develop.

Subjects were evaluated for alcohol and substance abuse following the format of the Addiction Severity Index interview, with an assessment of the total number of days in a typical month in that time period when the subject used a particular substance (28). For alcohol, the subjects were asked how many days they used alcohol to the point of intoxication (that is, three or more drinks per day) in a typical month. Subjects were also evaluated for the total number of alcoholic beverages consumed in a typical day, following the format of the Addiction Severity Index. Benzodiazepine use of any kind (both prescribed and that obtained by other means) was collapsed into a single category entitled benzodiazepine abuse.

The longitudinal course of stressful life events was assessed following the format of Paykel et al. (29). This inventory has been widely used in the stressful life events literature. By means of the lifeline procedure described earlier, a comprehensive assessment of life events in each 2-year time period was determined for 50 patients.

The history of treatment for PTSD since the time of the war was also assessed. Patient records were reviewed for the first psychiatric or alcohol-related hospitalization, total number of inpatient psychiatric- and alcohol-related hospitalizations, total number of days spent in the hospital, time of first recorded diagnosis of PTSD, and history of psychopharmacological treatment for PTSD. Patient records could not be located for one subject.

Data Analysis

Repeated measures analysis of variance (ANOVA) was used to evaluate the difference in symptoms in each of the symptom clusters (intrusions, avoidance, and hyperarousal) at the different time points from 2 years before the war until the present time. Repeated measures were performed in a single group of 61 subjects over 14 time points. Post hoc contrasts were used to evaluate the difference in symptoms between the 2-year time period before the war and each subsequent time point. A similar procedure was used to evaluate the course of alcohol and substance abuse over time. Chi-square analysis was performed on data related to the effect of alcohol and substances on each of the PTSD symptoms, with comparisons of whether that particular substance makes the symptom better, has no effect, or makes the symptom worse. Pearson product correlations were used to evaluate the relationship between total number of stressful life events and total number of PTSD symptoms in each 2-year time interval. Two-tailed nonpaired t tests were used to compare Mississippi scale scores for patients with early and late first hospitalizations, high and low number of hospitalizations, and a history of treatment with antidepressants or benzodiazepines compared to no treatment. Significance was defined as $p<0.05$.

TABLE 1. Lifetime and Current Diagnoses of Comorbid Psychiatric Disorders in Patients With Combat-Related PTSD (N=47)

	Lifetime Diagnosis		Current Diagnosis	
Diagnosis	N	%	N	%
Major depression	33	70	16	34
Dysthymia	9	19	12	26
Bipolar disorder	2	4	1	2
Cyclothymia	3	6	2	4
Panic disorder with agoraphobia	14	30	13	28
Panic disorder without agoraphobia	4	9	4	9
Agoraphobia without panic disorder	4	9	5	11
Obsessive-compulsive disorder	8	17	8	17
Generalized anxiety disorder	1	2	1	2
Social phobia	5	11	3	6
Simple phobia	1	2	1	2
Bulimia	1	2	1	2
Psychotic disorder not otherwise specified	2	4	2	4
Alcohol dependence	37	79	0	0
Alcohol abuse	5	11	0	0
Sedative dependence	15	32	0	0
Sedative abuse	4	9	0	0
Marijuana dependence	26	55	0	0
Marijuana abuse	3	6	0	0
Stimulant dependence	12	26	0	0
Stimulant abuse	4	9	0	0
Opiate dependence	12	26	0	0
Opiate abuse	1	2	0	0
Cocaine dependence	16	34	0	0
Cocaine abuse	3	6	0	0
Hallucinogen dependence	9	19	0	0
Hallucinogen abuse	0	0	0	0
Polysubstance dependence	14	30	0	0
Polysubstance abuse	0	0	0	0

RESULTS

PTSD Symptoms After Exposure to Combat-Related Trauma in Vietnam

Longitudinal course. Repeated measures ANOVA showed that there was a significant difference in symptoms for each of the PTSD symptom clusters between the different time points; these symptoms included reexperiencing ($F=112$, $df=13, 780$, $p<0.0001$), avoidance ($F=133$, $df=13, 780$, $p<0.0001$), and hyperarousal ($F=202$, $df=13, 780$, $p<0.0001$). Post hoc contrasts showed that PTSD symptoms were greater at each time point during and after the war than in the 2-year baseline period before the war ($p<0.0001$) (figure 1).

Most of the patients developed PTSD within a few years of exposure to combat stress in Vietnam. Nine of 61 patients (15%) developed PTSD during their combat tour. Thirty-eight of 61 (62%) met criteria for PTSD within 2 years after the end of their combat tour. Symptoms typically increased steadily in the first few years and then plateaued, with the average subject experiencing five (SD=4) symptoms during Vietnam, 11 (SD=4) symptoms within 2 years after his tour, and 12 (SD=4) symptoms within 4 years after his tour, following which there was a gradual increase until the present, when there was an average of 15 (SD=2) symptoms. None of the patients interviewed had a period when they did not meet criteria

FIGURE 1. Severity of PTSD Symptoms, Grouped by Individual Symptom Clusters, Over Time for 61 Vietnam Veterans With Combat-Related PTSD

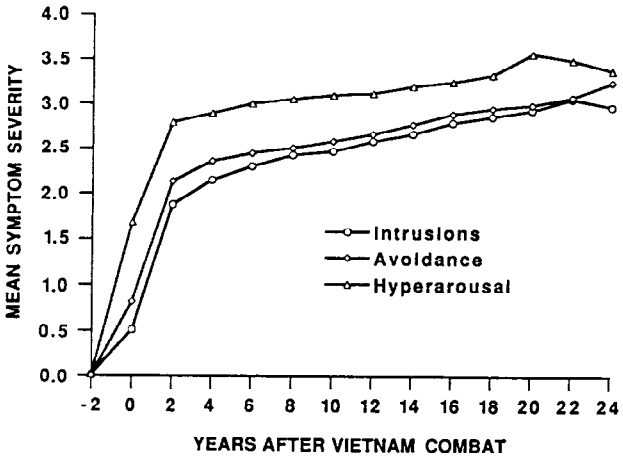


TABLE 2. Symptoms Reported by Patients With Combat-Related PTSD (N=56)[a] to Be the First in the Natural Course of Their Disorder

	First Symptom		First or Second Symptom	
Symptom	N	%	N	%
Being on guard	22	39	32	57
Being easily startled	5	9	19	34
Feeling emotionally numb	13	23	16	29
Sleep disturbance	4	7	10	18
Irritability	4	7	9	16
Feeling cut off from others	2	4	9	16
Feeling less strongly about things	0	0	3	5
Avoidance of thinking about things	3	5	4	7
Avoidance of war reminders	0	0	2	4
Amnesia for war	0	0	1	2
Intrusive memories	2	4	2	4
Nightmares	1	2	1	2
Flashbacks	0	0	1	2
Feeling worse with war reminders	0	0	0	0

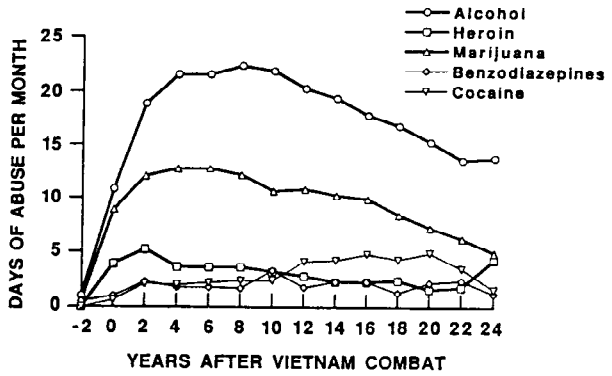
[a]Five patients were unable to state which were the first symptoms to develop.

for PTSD after the initial onset of the disorder. In addition, symptom severity typically remained at a high level after the onset of symptoms, with little variation over the course of the disorder.

Eight patients did not meet full criteria for PTSD until more than 10 years after Vietnam. Examination of these patients showed that almost all of them showed an increase in PTSD symptom levels within 2 years after Vietnam. Two years after the war five of the eight had five or more PTSD symptoms; 4 years and 6 years after the war seven of eight had five or more PTSD symptoms. In addition, all eight patients developed symptoms of being on guard and easily startled within 2 years of their exposure to combat trauma. These symptoms persisted until the time when they developed enough symptoms to meet full criteria for PTSD.

Characteristics of initial onset of symptoms. The first

FIGURE 2. Longitudinal Course of Alcohol and Substance Abuse for 61 Vietnam Veterans With Combat-Related PTSD



symptoms to develop after exposure to the trauma of war were from the hyperarousal category (figure 1). Of the 56 patients who were able to rank the order in which their symptoms developed (five patients were unable to do so), 35 (63%) reported a symptom from the hyperarousal cluster as being the first to develop, 18 (32%) reported a symptom from the avoidant cluster as being the first symptom to develop, and only three (5%) reported a symptom from the intrusive cluster as being the first symptom to develop. The symptoms that were most commonly reported as having developed first were being on guard, feeling emotionally numb, and increased startle (table 2).

Alcoholism and substance abuse. The natural course of alcohol and substance abuse followed a pattern similar to that of PTSD symptoms (figure 2). Repeated measures ANOVA showed significant differences over time from 2 years before the war until the present for alcohol abuse ($F=27.6$, $df=13, 780$, $p<0.0001$), heroin abuse ($F=3.1$, $df=13, 780$, $p=0.01$), marijuana abuse ($F=9.9$, $df=13, 780$, $p<0.0001$), and cocaine abuse ($F=5.2$, $df=13, 780$, $p<0.0001$). Post hoc contrasts showed significant increases at every time point during and after the war in comparison to the 2-year period before the war for alcohol, marijuana, and cocaine abuse; there was a significant increase for heroin for every time point except for 22 and 24 years after the war, in comparison to before the war ($p<0.05$). There was not a significant difference in benzodiazepine abuse between the different time points. Patients in general found alcohol and heroin helpful for PTSD symptoms in the intrusive and hyperarousal categories and benzodiazepines and marijuana helpful for hyperarousal symptoms, while cocaine had a tendency to worsen symptoms in the hyperarousal category (table 3).

Course of Treatment for PTSD

The majority of patients were first diagnosed with PTSD after 1988. There is almost no record of patients receiving psychopharmacological treatment before 1989. Thirty-five patients (58%) received antidepressants, and 34 (57%) received benzodiazepines at some time, while other patients were administered clonidine (10%), buspirone

(5%), sedative hypnotics (7%), carbamazepine (7%) valproic acid (7%), propranolol (5%) and neuroleptics (5%). The majority of patients had their first psychiatric hospitalization after 1990, at least 15 years after the war. However, this may be because patients may have been in treatment at other hospitals or because of a lack of accurate patient records. Thirty-three patients (55%) were hospitalized a total of less than five times, and 27 (45%) a total of five or more times. There was no difference in current PTSD symptom severity, as measured by the Mississippi scale, between patients hospitalized for the first time before 1990 and patients first hospitalized in 1990 or later, patients with five or more hospitalizations and those with fewer than five hospitalizations, or patients who had been treated with antidepressants at some time and those who had never been treated with antidepressants. There was no relationship between total number of stressful life events and number of PTSD symptoms in any given 2-year period included in this study.

TABLE 3. Effects of Alcohol and Drug Abuse on Symptoms of PTSD in Patients With Combat-Related PTSD

	Change in Symptom[a]				
Symptom	Alcohol	Marijuana	Heroin	Benzodiazepines	Cocaine
Intrusive memories			+		
Nightmares	+		+		
Flashbacks			+		
Feeling worse with war reminders			+		
Avoidance of thinking about the war					
Avoidance of reminders of the trauma					
Amnesia for war					
Decreased interest in things					
Feeling cut off from others	+				
Feeling less strongly about things					
Feeling emotionally numb					
Sleep disturbance	+	+	+	+	−
Irritability			−	+	
Decreased concentration					
Feeling on guard	+		+	+	−
Being easily startled	+		+	+	−

[a]+, More patients reported an improvement in symptom with the drug than no change or worsening ($\chi^2>5.99$, $p<0.05$). −, More patients reported a worsening in symptom with the drug than no change or improvement ($\chi^2>5.99$, $p<0.05$).

DISCUSSION

The longitudinal course of chronic combat-related PTSD in Vietnam veterans was characterized by the onset of symptoms during the Vietnam War and an increase in symptoms during the first few years after the war. Symptoms plateaued and became chronic within a few years of the war until the time the subject presented for treatment. Symptoms of hyperarousal appeared first and were greatest in severity early in the course of the disorder, followed by symptoms in the avoidant and intrusive clusters. Increases in alcohol and substance abuse closely paralleled the increase in PTSD symptoms seen in the period during and immediately after the war. Patients reported that alcohol, heroin, marijuana, opiates, and benzodiazepines (but not cocaine) were beneficial for their symptoms of PTSD.

This study provides new information about the natural course of chronic combat-related PTSD. Symptoms in the hyperarousal category, such as being on guard and easily startled, were most commonly reported as being the first to develop after exposure to combat stress. We have used the term "symptom" to refer to hyperarousal and other phenomena throughout this paper. It should be noted, however, that these "symptoms" had survival value at the time of the war and were probably present in the majority of veterans. Although these symptoms went away in many veterans at some point after the war (8), in our chronic PTSD patients these symptoms persisted and were maladaptive during civilian life. It is only when these symptoms persist into the time of civilian life, when they are no longer adaptive, but become maladaptive, that they become true symptoms. The mechanism of extinction is responsible for the elimination of responses such as hyperarousal with trauma-related cues when the individual moves from an environment where these cues are signs of danger to an environment where they do not represent a threat. A failure of extinction in PTSD patients is responsible for the persistence of these types of responses into civilian life, when they become manifestations of psychiatric symptoms.

Our findings are also of interest from the standpoint of previous formulations about the longitudinal course of PTSD (30). Horowitz (31) has hypothesized that PTSD is cyclical in nature, with periods of intrusive symptoms alternating with periods of numbing or avoidant symptoms. Intrusive symptoms repeatedly break through into consciousness because of a need for cognitive assimilation, while avoidance symptoms are a defense against the intrusions, designed to reduce anxiety. Our findings are not consistent with a cyclical course of intrusions and avoidance but suggest that symptoms are typically chronic and unremitting. This may be, however, a characteristic of our population, which is a chronic treatment-seeking group studied over 20 years after exposure to the original trauma, or of our study design in which symptoms were assessed at 2-year intervals.

Little is known about the delayed-onset subtype of PTSD, although it is currently incorporated into diagnostic systems (32). In a study of 1,007 young adults with a lifetime PTSD prevalence rate of 9.2%, only one case was determined to be of delayed onset (33). A study of World War II POWs also found no evidence for delayed onset of PTSD at follow-up (6). No differ-

ences were found in MMPI scores or other variables of psychopathology between Vietnam veterans who stated that their PTSD symptoms began within 6 months of their traumatic exposure in Vietnam and those who said their symptoms began 6 months after Vietnam (34). Many case reports of delayed-onset PTSD have been reported, however, in the clinical literature (35, 36). In patients who were survivors of a German concentration camp, one-fifth had a period of 6 months or so of "latency" during which they were able to work, and three of 40 were apparently symptom free for 12 months or more (4). It is important to distinguish between a delay in onset in symptoms of PTSD and delay in onset of disability related to these symptoms. Many of the patients we interviewed in the current study reported a lifetime of productive work and family life before the recent onset of total dysfunction. When asked about those years, they would often report that they were doing well during that period of time. Upon inquiry about specific symptoms with the structured interview, however, all of the patients in this study reported at least some symptoms dating back to the time of the war. Many patients reported attempting to work as much as possible in an effort to ward off intrusive memories, until a certain point when their disorder made it impossible to continue working.

Longitudinal studies have not been performed with PTSD for several reasons. PTSD was recognized as a valid diagnostic entity only in 1980. In addition, it is unethical to expose individuals to a traumatic stressor that would result in the development of the disorder in order to study the course of the development of PTSD. Another option is to follow a population sample over time in order to study the fraction of individuals who will become traumatized and develop PTSD. Since noncombat PTSD is often related to a lifetime of traumatic stressors, and since it is difficult to study soldiers at the advent of a military conflict, these solutions are not feasible. In the absence of prospective longitudinal studies, retrospective designs such as the current one are the best method of obtaining information about the longitudinal course of a disorder. Nevertheless, factors such as deficient recall (37) may limit the retrospective study design as applied to patients with PTSD. In addition, our findings may not be generalizable to other patient populations with PTSD related to other stressors, such as childhood abuse, which may have a different symptom course and pattern.

Alcohol and substance abuse increased in parallel with PTSD symptoms, and the patients reported that alcohol and substances (with the exception of cocaine) were beneficial for their symptoms. These findings are consistent with the hypothesis that patients with PTSD self-medicate their PTSD symptoms with alcohol and substances (22). It is also possible that alcohol and substance abuse occurred independently of PTSD and may have actually increased the risk of development of PTSD after exposure to a stressor (38, 39). It is interesting to consider our findings with reference to previous studies of the natural history of alcoholism (40–43). Prior studies in alcoholism have not found evidence for a typical natural course in which there is progression from moderate drinking to chronic heavy drinking. Rather, there is a heterogeneous course, with some individuals progressing from moderate to heavy drinking and others progressing from moderate drinking to abstinence, with no apparent predictability of pattern (40). Some studies have found an increase in alcohol consumption early in life, with either remission or progression to chronicity in middle life (41). It is difficult to say whether our current data fit a pattern of uncomplicated alcoholism. However, our current data show a remarkable increase in magnitude of consumption parallel to symptoms of PTSD, with some decrease in middle life. It seems unlikely that this extent of alcohol abuse could be explained as part of a natural progression of uncomplicated alcoholism alone, as opposed to a picture that is related to the pathophysiology of PTSD.

Our data on the natural course of alcoholism and substance abuse should, however, be interpreted with caution. It is possible that patients' memories of subjective sensations while intoxicated do not correspond to their actual affective state. For instance, many people report euphoria after the fact with alcohol intoxication, even though at the time of intoxication they were tearful and agitated. PTSD patients with comorbid alcohol and substance abuse may also be more likely to seek treatment because of the increased disability that having both conditions entails.

Prior studies have shown a relationship between current PTSD symptom severity and current life stressors (14, 44–46), as well as exposure to previous stressors in the form of early trauma (47) or participation in previous military conflicts (48–50). The natural course of PTSD in our patients was characterized by a chronic course that was unaffected by treatment interventions or concurrent life stressors. Consistent with this, treatment studies with fluoxetine have not shown efficacy for Vietnam combat veterans with chronic PTSD, although patients with a history of civilian trauma such as abuse did respond to treatment (51). It is possible that for patients with combat-related PTSD, enough time has passed since exposure to the trauma of combat in Vietnam that their disorder has become chronic and resistant to treatment interventions. Treatment interventions that occur soon after exposure to the trauma may have more benefit for PTSD.

REFERENCES

1. Figley CR: Psychological adjustment among Vietnam veterans: an overview of the research, in Stress Disorders Among Vietnam Veterans. Edited by Figley CR. New York, Brunner/Mazel. 1978
2. Thygesen P, Hermann K, Willanger R: Concentration camp survivors in Denmark: persecution, disease, disability, compensation. Dan Med Bull 1970; 17:65–108
3. Helweg-Larsen P, Hoffmeyer H, Kieler J, Thaysen EH, Thaysen JH, Thygesen P, Wulff MH: Famine disease in German concentration camps: complications and sequelae. Acta Med Scand 1952; 274:235–460
4. Speed N, Engdahl B, Schwartz J, Eberly R: Posttraumatic stress disorder as a consequence of the POW experience. J Nerv Ment Dis 1989; 177:147–153

5. Ursano RJ, Boydstun JA, Wheatley RD: Psychiatric illness in US Air Force Viet Nam prisoners of war: a five-year follow-up. Am J Psychiatry 1981; 138:310–314
6. Kluznik JC, Speed N, VanValkenburg C, Magraw R: Forty-year follow-up of United States prisoners of war. Am J Psychiatry 1986; 143:1443–1446
7. Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS: Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study. New York, Brunner/Mazel, 1990
8. Mellman TA, Randolph CA, Brawman-Mintzer O, Flores LP, Milanes FJ: Phenomenology and course of psychiatric disorders associated with combat-related posttraumatic stress disorder. Am J Psychiatry 1992; 149:1568–1574
9. Davidson RT, Kudler HS, Saunders WB, Smith RD: Symptom and morbidity patterns in World War II and Vietnam veterans with post-traumatic stress disorder. Compr Psychiatry 1990; 31: 1662–1170
10. Southwick SM, Morgan A, Nagy LM, Bremner JD, Nicolaou AL, Johnson DR, Rosenheck R, Charney DS: Trauma-related symptoms in veterans of Operation Desert Storm: a preliminary report. Am J Psychiatry 1993; 150:1524–1528
11. McFarlane AC: The aetiology of posttraumatic stress disorders following a natural disaster. Br J Psychiatry 1988; 152:116–121
12. McFarlane AC: The longitudinal course of posttraumatic morbidity: the range of outcomes and their predictors. J Nerv Ment Dis 1988; 176:30–39
13. Kinzie JD, Sack WH, Angell RH, Manson S: A three-year follow-up of Cambodian young people traumatized as children. J Am Acad Child Adolesc Psychiatry 1989; 28:501–504
14. Sack WH, Clarke G, Him C, Dickason D, Goff B, Lanham K, Kinzie JD: A 6-year follow-up study of Cambodian refugee adolescents traumatized as children. J Am Acad Child Adolesc Psychiatry 1993; 32:431–437
15. True WR, Goldberg J, Eisen SA: Stress symptomatology among Vietnam veterans: analysis of the Veterans Administration survey of veterans, II. Am J Epidemiol 1988; 128:85–92
16. Faustman WO, White PA: Diagnostic and psychopharmacological treatment characteristics of 536 inpatients with posttraumatic stress disorder. J Nerv Ment Dis 1989; 177:154–159
17. Boman B: Combat stress, post-traumatic stress disorder, and associated psychiatric disturbance. Psychosomatics 1986; 27:567–573
18. Sierles FS, Chen J-J, McFarland RE, Taylor MA: Posttraumatic stress disorder and concurrent psychiatric illness: a preliminary report. Am J Psychiatry 1983; 140:1177–1179
19. Yager T, Laufer R, Gallops M: Some problems associated with war experience in men of the Vietnam generation. Arch Gen Psychiatry 1984; 41:327–333
20. 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
21. Boscarino J: Patterns of alcohol use among veterans and nonveterans: a confirmation of previous findings. Am J Public Health 1981; 71:85–87
22. Kosten TR, Krystal JH: Biological mechanisms in PTSD: relevance for substance abuse. Recent Dev Alcohol 1988; 6:49–68
23. Davidson J, Swartz M, Storck M, Krishnan RR, Hammett E: A diagnostic and family study of posttraumatic stress disorder. Am J Psychiatry 1985; 142:90–93
24. Spitzer RL, Williams JBW, Gibbon M: Structured Clinical Interview for DSM-III-R (SCID). New York, New York State Psychiatric Institute, Biometrics Research, 1987
25. Keane TM, Caddell JM, Taylor KL: Mississippi Scale for Combat-Related Posttraumatic Stress Disorder: three studies in reliability and validity. J Consult Clin Psychol 1988; 56:85–90
26. Keane TM, Fairbank JA, Caddell JM: Clinical evaluation of a scale to measure combat exposure. Psychol Assessment 1989; 1:53–55
27. Breier A, Charney DS, Heninger GR: Agoraphobia with panic attacks: development, diagnostic stability, and course of illness. Arch Gen Psychiatry 1986; 43:1029–1036
28. McClellan AT, Luborsky A, Cacciola J, Griffith J, Evans F, Bar HL, O'Brien CP: New data from the addiction severity index: reliability and validity in three centers. J Nerv Ment Dis 1985; 73:412–423
29. Paykel ES, Prusoff BA, Myers JK: Suicide attempts and recent life events: a controlled comparison. Arch Gen Psychiatry 1975; 32: 327–333
30. Green BL, Lindy JD, Grace MC: Posttraumatic stress disorder: toward DSM-IV. J Nerv Ment Dis 1985; 173:406–411
31. Horowitz M: Stress Response Syndromes. New York, Jason Aronson, 1976
32. Brett EA, Spitzer RL, Williams JBW: DSM-III-R criteria for posttraumatic stress disorder. Am J Psychiatry 1988; 145:1232–1236
33. 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
34. Watson CG, Kucala T, Manifold V, Vassar P, Juba M: Differences between posttraumatic stress disorder patients with delayed and undelayed onsets. J Nerv Ment Dis 1988; 176:568–572
35. Horowitz MJ, Solomon GF: A prediction of delayed stress response syndromes in Vietnam veterans. J Soc Issues 1975; 31: 67–80
36. Pomerantz AS: Delayed onset of PTSD: delayed recognition or latent disorder? (letter). Am J Psychiatry 1991; 148:1609
37. Bremner JD, Scott TM, Delaney RC, Southwick SM, Mason JW, Johnson DR, Innis RB, McCarthy G, Charney DS: Deficits in short-term memory in posttraumatic stress disorder. Am J Psychiatry 1993; 150:1015–1019
38. Figley CR (ed): Stress Disorders Among Vietnam Veterans. New York, Brunner/Mazel, 1978
39. Bremner JD, Southwick SM, Charney DS: Etiologic factors in the development of posttraumatic stress disorder, in Stress and Psychiatric Disorders. Edited by Mazure CM. Washington, DC, American Psychiatric Press, 1994, pp 149–186
40. Skog O-J, Duckert F: The development of alcoholics' and heavy drinkers consumption: a longitudinal study. J Stud Alcohol 1993; 54:178–188
41. Leung PK, Kinzie JD, Boehnlein JK, Shore JH: A prospective study of the natural course of alcoholism in a Native American village. J Stud Alcohol 1993; 54:733–738
42. Finney JW, Moos RH: The long-term course of treated alcoholism, I: mortality, relapse and remission rates and comparisons with community controls. J Stud Alcohol 1991; 52:44–54
43. Vaillant GE: Is there a natural history of addiction? Res Publ Ass Res Nerv Ment Dis 1992; 70:41–57
44. Green MA, Berlin MA: Five psychosocial variables related to the existence of posttraumatic stress disorder symptoms. J Clin Psychol 1987; 43:643–649
45. Green BL, Grace MC, Lindy JD, Gleser GC, Leonard A: Risk factors for PTSD and other diagnoses in a general sample of Vietnam veterans. Am J Psychiatry 1990; 147:729–733
46. Hyer L, Boudewyns P, O'Leary W: Key determinants of the MMPI-PTSD subscale: treatment considerations. J Clin Psychol 1987; 43:337–340
47. Bremner JD, Southwick SM, Johnson DR, Yehuda R, Charney DS: Childhood physical abuse and combat-related posttraumatic stress disorder in Vietnam veterans. Am J Psychiatry 1993; 150: 235–239
48. Solomon Z, Garb R, Bleich A, Grupper D: Reactivation of combat-related posttraumatic stress disorder. Am J Psychiatry 1987; 144:51–55
49. Solomon Z, Mikulincer M, Jakob BR: Exposure to recurrent combat stress: combat stress reactions among Israeli soldiers in the Lebanon War. Psychol Med 1987; 17:433–440
50. Solomon Z, Neria Y, Ohry A, Waysman M, Ginzburg K: PTSD among Israeli former prisoners of war and soldiers with combat stress reaction: a longitudinal study. Am J Psychiatry 1994; 151: 554–559
51. van der Kolk BA, Dreyfuss D, Michaels M, Shera D, Berkowitz R, Fisher R, Saxe G: Fluoxetine in posttraumatic stress disorder. J Clin Psychiatry 1994; 55:517–522