

Risk Factors for Course of Posttraumatic Stress Disorder Among Vietnam Veterans: A 14-Year Follow-Up of American Legionnaires

Karestan C. Koenen

VA Boston Healthcare System and Boston Medical Center

Jeanne Mager Stellman and Steven D. Stellman

Columbia University

John F. Sommer Jr.

The American Legion

Risk factors affecting the course of posttraumatic stress disorder (PTSD) are poorly understood. As part of a larger study on characterizing exposure to herbicides in Vietnam, the authors investigated this issue in a random sample of 1,377 American Legionnaires who had served in Southeast Asia during the Vietnam War and were followed over a 14-year period. High combat exposure, perceived negative community attitudes at homecoming, minority race, depression symptoms at Time 1, and more anger at Time 1 predicted a more chronic course. Community involvement at Time 1 was protective and associated with decreased risk at Time 2. Discomfort in disclosing Vietnam experiences was associated with an increased risk for developing PTSD but did not predict its course. Combat exposure predicted PTSD course more strongly than any other risk factor. Findings suggest recovery from PTSD is significantly influenced by perceived social support.

According to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association, 1994), the diagnosis of posttraumatic stress disorder (PTSD) requires exposure to a traumatic event, such as combat, and is defined by three symptom clusters: reexperiencing the traumatic event, avoidance of traumatic reminders and emotional numbing, and hyperarousal. PTSD afflicts a sizeable proportion of the 3.2 million men and women who served in the U.S. armed forces in Vietnam. In the National Vietnam Veterans Readjustment Study (Kulka et al., 1990), the lifetime prevalence of PTSD was 30.9% among Vietnam theater veterans. Furthermore, PTSD was a chronic condition for about half of these veterans, with a current prevalence of 15.2%.

Karestan C. Koenen, Women's Health Sciences Division, National Center for Posttraumatic Stress Disorder, VA Boston Healthcare System and Department of Child and Adolescent Psychiatry, Boston Medical Center; Jeanne Mager Stellman, Department of Health Policy and Management, Mailman School of Public Health, Columbia University; Steven D. Stellman, Department of Epidemiology, Mailman School of Public Health, Columbia University; John F. Sommer Jr., The American Legion, Washington, DC.

This research was supported by National Academy of Sciences Subcontract NAS-VA-5124-98-001; by USPHS Grants CA-17613, CA-68384, and CA-91401; by National Research Service Award Postdoctoral Training Grant 5T32MH13043 in psychiatric epidemiology awarded to Karestan C. Koenen; and by the American Legion and the American Cancer Society. We gratefully acknowledge the efforts of Tracy Weber and Carrie Tomassallo in carrying out the follow-up.

Correspondence concerning this article should be addressed to Jeanne Mager Stellman, Department of Health Policy and Management, Mailman School of Public Health, Columbia University, 600 West 168th Street, 6th floor, New York, New York 10032. E-mail: jms13@columbia.edu

Despite its high prevalence among Vietnam veterans, little is known about the course of PTSD over time and the factors that differentiate between PTSD that persist and those that remit. Some clues can be found by comparing studies of risk factors for lifetime PTSD with studies of current PTSD. Studies of lifetime PTSD provide information about risk factors that affect onset (who develops the disorder), whereas studies of current PTSD provide information about risk factors that predict course or chronicity of PTSD.

The literature on risk factors for lifetime PTSD has been summarized in a meta-analysis by Brewin, Andrews, and Valentine (2000). Pretrauma factors of family psychiatric history, personal psychiatric history, and childhood abuse most consistently predicted PTSD, regardless of the population studied or the methods used. Other important risk factors for veterans included younger age at the trauma, less education, minority status, and family adversity. Trauma severity and posttrauma social support were more important in military than in civilian samples.

Risk factors can be grouped as predisposing or pretrauma factors, traumatic event characteristics, and posttrauma factors. In studies of chronic PTSD in veterans, predisposing factors have included non-Caucasian ethnicity, lower intelligence or education, younger age at exposure, lower socioeconomic status, family problems in childhood, pretrauma psychopathology, and childhood behavior problems (Engdahl, Dikel, Eberly, & Blank, 1997; D. W. King, King, Foy, & Gudanowske, 1996; Kulka et al., 1990; McNally & Shin, 1995). Event characteristics that increase risk for chronic PTSD include type of trauma, amount of exposure, injury, involvement in atrocities, and perceived life threat (Engdahl et al., 1997; Green, Grace, Lindy, Gleser, & Leonard, 1990; D. W. King et al., 1996; Kulka et al., 1990; Wolfe, Erickson, Sharkansky, King, & King, 1999). Postevent factors that predict chronic PTSD

in veterans are low social support, negative homecoming experiences, and poor coping and posttraumatic life events (Boscarino, 1995; Engdahl et al., 1997; Green et al., 1990; L. A. King, King, Fairbank, Keane, & Adams, 1998; Solomon, Mikulincer, & Avitzur, 1988).

In contrast to the many studies of chronic PTSD, few prospective studies have been carried out that might shed light on the time course of PTSD. Most have been of relatively short duration and only one of these has focused on war veterans (Wolfe, Erickson, Sharkansky, King, & King, 1999). The only previous long-term studies of PTSD course have been retrospective, focusing on World War II veterans (Op den Velde et al., 1993; Zeiss & Dickman, 1989). Both found that course of PTSD followed three different patterns: high levels of symptoms after the war followed by recovery, chronic symptoms persisting until the time of the assessment, or relapsing–remitting symptoms. Acute and delayed onsets were reported in both studies.

The continuing high rate of PTSD in Vietnam veterans and the likelihood that new military conflicts may create a new generation of war veterans underscore the need to understand factors related to persistence of and recovery from PTSD. Accordingly, we carried out a prospective study with three aims: (a) to identify patterns of PTSD course over a 14-year period; (b) to determine which risk factors differentiate these patterns; and (c) to discover which risk factors are associated with course of PTSD, with special attention being given to the possible role of post-Vietnam perceived social support and perceived negative community attitudes.

Method

Design of Study

Our study used a cohort that was originally established in 1984 for a study of the health and well-being of American Legion members. The cohort consists of a random sample of all male members of the American Legion who in October 1983 belonged to any American Legion Post in Colorado, Indiana, Maryland, Minnesota, Ohio, or Pennsylvania and who had served in the U.S. Armed Forces during the official Vietnam War period: January 1961 through May 1975. The cohort was surveyed by mailed questionnaire in 1984 (Time 1) and again in 1998 (Time 2). The two questionnaire versions were nearly identical. The cohort sample selection procedure was reported previously (Snow, Stellman, Stellman, & Sommer, 1988; Stellman, Stellman, & Sommer, 1988a, 1988b, 1988c, 1988d). The follow-up was part of a larger methodological study for characterizing veteran exposure to herbicides used in Vietnam.

Extensive efforts were made to update the 1984 mailing list and, especially, to locate those who had dropped their American Legion membership in the interim or to identify those who had died. These efforts included using private tracing firms, online Yellow Pages, and commercial name and address listings; accessing military record data from the National Personnel Records Center (U.S. National Archives and Records Administration, St. Louis, MO); and networking within the American Legion. Through these efforts, 8,088 eligible veterans were located and sent questionnaires. Nonrespondents were followed up with several repeat mailings and additional inquiries.

The study protocol, survey instruments, and explanatory cover letters for 1984 and 1998 were approved by the Institutional Review Board of the Columbia Presbyterian Medical Center. The cover letter that accompanied the survey explained the purpose of the study and gave assurance that participation was entirely voluntary, that responses would be maintained with strict confidence, and that the participant could withdraw at any time without prejudice. After all follow-up attempts, 4,490 men completed and

returned their questionnaires, for a response rate of 55.5%. Of these, 3,403 men had previously responded at Time 1 (Table 1). Follow-up efforts and questionnaire responses regarding military assignments resulted in some corrections to the military service status originally reported in 1984.

Participants

The study population included 1,377 veterans with valid combat scores who served between 1961 and 1975 in the Republic of Vietnam and/or its surrounding waters or airspace who returned questionnaires at both times. This group represents 94% of all 1,462 Southeast Asia participants. The majority of the cohort was Caucasian (98.9%), and in 1984, their average age was 39 years, 85.6% were married, and most (95.2%) had a high school education or more. Veterans who did not respond at Time 2 were not different from those who responded on any demographic variables. However, those who did not respond in 1998 had higher PTSD symptoms in 1984 ($M = 43.72$, $SD = 13.62$) than those who responded at both times, $M = 37.37$, $SD = 14.54$; $t(2906.60) = -13.69$, $p < .001$.

Measures

Risk factor data were taken from the 1984 survey. The questionnaire elicited demographic information (date of birth, race/ethnicity, marital status, and level of education) and a detailed military service history. Vietnam combat exposure was assessed with an eight-question Likert-type scale with five possible responses that has previously been validated in studies of Vietnam veterans (Figley, 1978; Frye & Stockton, 1982; Snow et al., 1988; Stellman et al., 1988a, 1988b, 1988c, 1988d). The questions, covering the extent of enemy fire and life-threatening situational exposures, were summed with a total score ranging from 8 to 40. The coefficient alpha for the scale was .96 in both 1984 and 1998. The test–retest reliability was .88 over 14 years. For these analyses, we use the data provided by the veterans in 1984 (Time 1), as it is closer in time to the events. For comparability with our previous report (Stellman et al., 1988a), the scores were categorized as low (8–15, $N = 520$), medium (16–25, $N = 566$), or high (26–40, $N = 291$).

Perceived social support was assessed on a 5-point Likert-type scale by the question: “How helpful was your family to you in getting used to civilian life again?” The test–retest reliability over 14 years was $r = .70$ ($p < .001$). Perceived negative community attitudes were assessed on a 5-point Likert scale with the question: “What did you feel the attitude of your community (not including your immediate family and close friends) was on your discharge?” The test–retest reliability over 14 years was $r = .55$ ($p < .001$). Discomfort disclosing Vietnam experiences was assessed on a 5-point Likert-type scale by the question “How easy was it to talk to your family or friends about your service experiences?” Community involvement was determined by how often participants had taken part in meetings or activities related to public affairs or community service (not at all, less than six times, six times or more) during the past year. Alcohol use was determined by summing the number of drinks (beer, wine, hard liquor) the respondent reported drinking on an average day and multiplying the result by the number of days per week he drank. Emotional distress was

Table 1
Final Sample Sizes for Two Data Collection Times

Variable	Time 1 <i>n</i> (%)	Time 2 <i>n</i> (%)	Common to both times <i>n</i> (%)
Vietnam theater	2,868 (44.3)	1,807 (40.2)	1,462 (42.9)
Vietnam era	3,610 (55.7)	2,678 (59.7)	1,941 (57.1)
Unknown	2 (0.0)	5 (0.1)	0 (0.0)
Total	6,480 (100)	4,490 (100)	3,403 (100)

assessed with the Depression and Anger subscales from the Psychiatric Epidemiology Research Instrument (Dohrenwend, Shrout, Egri, & Mendelsohn, 1980). For each of five depression symptoms (sad or depressed, in very low spirits, lonely, feel like crying, and feel like nothing is worthwhile anymore) or four anger items (angry, irritated or annoyed, aggravated, and frustrated), participants were asked to indicate how often they felt that way during the past 5 months on a 5-point Likert-type scale. These scales, as ascertained in 1984, showed internal consistencies of .87 and .92, respectively (Stellman et al., 1988c).

We evaluated PTSD symptoms at both times using the 17-item 5-point Likert-type PTSD Symptom Frequency Scale developed for the 1984 survey following the diagnostic criteria for PTSD as defined by the third edition of the *DSM* (*DSM-III*; American Psychiatric Association, 1980). Veterans were asked how frequently they experienced each symptom in the past month, with response options ranging from "never" to "very often." Reliability was excellent in the current study, with coefficient alphas of .93 in 1984 and .95 in 1998. Construct validity was demonstrated by the scale's dose-response relationship to combat exposure (Snow et al., 1988). As the PTSD symptoms from the *DSM-III* were identical to those in the revised third edition *DSM* (*DSM-III-R*; American Psychiatric Association, 1987), presumptive PTSD diagnosis was determined according to *DSM-III-R* criteria to make results comparable to other studies of Vietnam veterans (e.g., Kulka et al., 1990). That is, the veteran must report "often" or "very often" to experiencing one symptom in the intrusive re-experiencing cluster, three symptoms in the avoidance/numbing cluster, and two symptoms in the arousal cluster to meet diagnostic criteria.

Statistical Analyses

Prevalence of PTSD at Times 1 and 2. Prevalence of PTSD in 1984 and 1998 was evaluated, first, separately for Time 1 and Time 2 and, second, for consistency across time periods. We used these assessments to divide veterans into four groups: PTSD at both times ($n = 74$), PTSD at Time 1 only ($n = 88$), PTSD at Time 2 only ($n = 71$), and no PTSD at any time ($n = 1,144$).

Risk factors by PTSD group. Groups were compared on risk factors using analysis of variance (ANOVA) for continuous measures and chi-square test for categorical measures. When an overall significant difference was found among the groups, post hoc tests were undertaken to determine the source of the differences. Because the homogeneity of the variance assumption was violated for most ANOVA comparisons, alpha was set to .01 as suggested by Tabachnick and Fidell (2001, p. 80).

Risk factors for PTSD at either Time 1 or Time 2. We examined the association between each risk factor and PTSD at either Time 1 or Time 2, adjusting for all other risk factors with multivariate logistic regression. This procedure allows the unique effect of each risk factor on PTSD to be examined accounting for the contribution of all other risk factors.

Risk factors for PTSD at Time 2. Prospective stepwise multivariate logistic regression analysis was conducted by regressing PTSD at Time 2 on the risk factors used in the PTSD group analysis while controlling for Time 1 PTSD. Risk factors were entered in four blocks: pre-Vietnam (minority race, age at entry into Vietnam), Vietnam (combat exposure), post-Vietnam homecoming (perceived social support, perceived negative community attitudes, and discomfort disclosing), and post-Vietnam 1984 (high school education or less, level of community involvement, number of drinks per week, depression symptoms, and anger). This procedure allows the unique effect of each risk factor on PTSD at Time 2 to be examined accounting for the contribution of PTSD at Time 1. Risk factors that predict PTSD at Time 2 after controlling for PTSD at Time 1 can be interpreted as contributing to PTSD course. Odds ratio (OR) and 95% confidence interval (CI) were used as measures of association between risk factors and PTSD and to evaluate their statistical significance.

Results

Prevalence of PTSD at Times 1 and 2

At Time 1, 11.8% of the sample met *DSM-III-R* criteria for PTSD. This decreased to a prevalence of 10.5% at Time 2. However, only 5.3% of participants met criteria for PTSD at both times, 6.5% met criteria at Time 1 only, and 5.2% met criteria at Time 2 only, whereas the great majority of veterans (83.0%) did not meet criteria for PTSD at either time. Participants who met criteria at Time 1 were over 14 times more likely to meet criteria at Time 2 than those who did not meet criteria at Time 1 (OR = 14.32, 95% CI = 9.30, 21.67).

Risk Factors for PTSD

Potential risk factors for PTSD were grouped chronologically (pre-Vietnam, Vietnam, Vietnam [combat exposure], post-Vietnam homecoming, and post-Vietnam 1984), and their distributions in the four PTSD diagnostic groups are compared in Table 2. Compared with men who never had PTSD, those with PTSD at any time were more likely to report high or medium combat exposure, report less perceived social support at homecoming, be of minority race, drink more per week at Time 1, feel more depressed at Time 1, and experience more anger at Time 1. Those with PTSD at both times reported more perceived negative community attitudes at homecoming, drank more per week, reported more depression symptoms, and expressed more anger than any other group. The Time 1 group reported more community involvement as compared with the group with PTSD at both times and less help from family after returning from Vietnam, more discomfort disclosing Vietnam experiences, drinking more per week, feeling more depressed, and experiencing more anger than the Time 2 group.

Risk Factors for PTSD at Time 1 or Time 2

Of the 1,377 veterans, 233 (16.9%) met criteria for PTSD for at least one time period. Table 3 shows the association of PTSD at either time with several potential risk factors. Significant risk factors included level of combat exposure, perceived negative community attitudes after return from Vietnam, discomfort disclosing Vietnam experiences, and depression symptoms and anger in 1984.

Risk Factors for PTSD at Time 2

Table 4 presents the results of the stepwise multivariate logistic regression analysis for PTSD at Time 2 after controlling for PTSD at Time 1. All four blocks of risk factors—pre-Vietnam, Vietnam, post-Vietnam homecoming, post-Vietnam 1984—made unique contributions to the model after we had controlled for previously entered blocks. In conjunction with other predictors in the model, individuals with PTSD at Time 1 were 4.75 times (95% CI = 2.88, 7.86) as likely to have PTSD at Time 2. After PTSD at Time 1, high combat exposure had a stronger association with PTSD at Time 2 than did any other risk factor. Other individual risk factors that were uniquely associated with PTSD at Time 2 in the final model were minority race, perceived negative community attitudes after return from Vietnam, depression symptoms, and anger at

Table 2
Risk Factor by PTSD Group for Vietnam Veterans (N = 1,377)

Risk factor	PTSD at T1 and T2 (n = 74)		PTSD T1 (n = 88)		PTSD T2 (n = 71)		No PTSD (n = 1,144)		Statistical test ^a	p ^b	Post hoc
Pre-Vietnam											
Minority race (n, %)	3	4.1	2	2.3	4	5.6	7	0.65	$\chi^2(3) = 22.14$	<.001	Both, T1, T2 > NoP
Age (in years) at entry into Vietnam (M, SD)	19.74	2.30	20.02	2.07	19.49	2.05	20.06	2.05	F(3, 1365) = 2.20	.09	ns
Vietnam combat exposure (n, %)											
Low	9	12.2	10	11.4	11	15.5	490	42.8	$\chi^2(6) = 125.53$	<.001	Both, T1, T2 > NoP
Medium	28	37.8	37	42.0	33	46.5	468	40.9			
High	37	50.0	41	46.6	27	38.0	186	16.3			
Post-Vietnam: Homecoming											
Perceived social support (M, SD)	2.70	1.24	2.49	1.16	2.15	1.09	1.88	1.01	F(3, 1363) = 22.60	<.001	Both, T1 > T2 > NoP
Perceived negative community attitudes (M, SD)	3.89	0.91	3.55	1.07	3.34	0.99	2.80	1.03	F(3, 1367) = 41.56	<.001	Both > T1, T2 > NoP
Discomfort disclosing experiences (M, SD)	4.08	1.08	3.98	1.08	3.59	1.12	2.65	1.26	F(3, 1372) = 67.76	<.001	Both, T1 > T2 > NoP
Post-Vietnam: 1984											
< high school education (n, %)	3	4.1	7	8.0	6	8.6	48	4.2	$\chi^2(3) = 5.19$.16	ns
Live-in partner (n, %)	60	81.1	74	85.1	62	89.9	1002	87.6	$\chi^2(3) = 10.37$.02	ns
Community involvement (M, SD)	1.61	0.83	1.93	0.87	1.70	0.87	1.96	0.86	F(3, 1365) = 5.66	.001	T1, NoP > Both; NoP > T2
Alcohol use (M, SD)	29.82	33.86	19.37	25.58	18.42	34.51	13.78	20.41	F(3, 1375) = 13.32	<.001	Both > T1, T2 > NoP
Depression symptoms (M, SD)	13.44	3.33	12.33	2.87	10.52	3.20	8.50	2.89	F(3, 1354) = 109.99	<.001	Both > T1 > T2 > NoP
Anger (M, SD)	15.04	3.27	14.06	3.28	12.33	3.30	10.25	3.00	F(3, 1340) = 97.83	<.001	Both > T1 > T2 > NoP

Note. PTSD = posttraumatic stress disorder; T1 = Time 1; T2 = Time 2; NoP = Veterans who did not meet criteria for PTSD at either T1 or T2.
^a Degrees of freedom vary because of missing data. ^b Alpha was set to $p < .01$ to correct for nonhomogeneity of the variances.

Table 3
OR for PTSD in Relation to Risk Factors at Time 1 or Time 2
(N = 1,377)

Risk factor	Lifetime PTSD OR (95% CI)
Pre-Vietnam	
Minority race	2.31 (0.61, 8.77)
Age at entry into Vietnam	0.95 (0.86, 1.05)
Vietnam combat exposure	
Medium versus low	1.90 (1.13, 3.21) ^a
High versus low	3.73 (2.13, 6.56) ^a
Post-Vietnam: Homecoming	
Perceived social support	0.98 (0.82, 1.17)
Perceived negative community attitudes	1.48 (1.19, 1.83) ^a
Discomfort disclosing experiences	1.50 (1.25, 1.79) ^a
Post-Vietnam: 1984	
< high school education	1.01 (0.46, 2.21)
Live-in partner	1.02 (0.57, 1.84)
Community involvement	0.85 (0.68, 1.06)
Alcohol use	1.00 (1.00, 1.01)
Depression symptoms	1.20 (1.12, 1.29) ^a
Anger	1.25 (1.16, 1.35) ^a

Note. OR = odds ratio; PTSD = posttraumatic stress disorder; CI = confidence interval.

^a 95% CIs that do not include 1 are statistically significant.

Time 1. Level of community involvement at Time 1 was associated with decreased risk for PTSD at Time 2 after controlling for PTSD at Time 1.

Discussion

This is the first longitudinal study to examine risk factors related to the course of PTSD in a large community sample of Vietnam veterans. In our survey, 11.8% of the veterans met *DSM-III-R* criteria for PTSD in 1984, whereas 10.4% met criteria in 1998. These findings are consistent with previous reports that a substantial minority of Vietnam veterans continue to experience PTSD symptoms many years after the war's end (Kulka et al., 1990; Snow et al., 1988) and that combat exposure is one of the traumatic events most commonly associated with PTSD for men in the general population (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). When PTSD prevalence is examined by time of follow-up, however, a different picture emerges: Only 5.3% of veterans met PTSD criteria in both 1984 and 1998, whereas 6.5% and 5.2% met criteria in 1984 and 1998, respectively. These data provide evidence of a heterogeneous course for PTSD, which is consistent with previous reports of World War II veterans (Op den Velde et al., 1993; Zeiss & Dickman, 1989).

The strongest predictor of PTSD in 1998 was PTSD in 1984. After adjusting for other risk factors, those with PTSD in 1984 were almost four times more likely to meet criteria for PTSD in

Table 4

Prospective Stepwise Multivariate Logistic Regression Predicting PTSD at Time 2 Controlling for PTSD at Time 1 (N = 1,377)

	Block 1: Pre-Vietnam	Block 2: Vietnam	Block 3: Post-Vietnam homecoming	Block 4: Post-Vietnam 1984
Model chi-square	$\chi^2(3, N = 1377) = 190.46,$ $p < .001$	$\chi^2(5, N = 1377) = 205.54,$ $p < .001$	$\chi^2(7, N = 1377) = 202.94,$ $p < .001$	$\chi^2(14, N = 1377) = 259.27,$ $p < .001$
Chi-square for block	$\chi^2(2, N = 1377) = 10.40,$ $p = .006$	$\chi^2(2, N = 1377) = 15.08,$ $p = .001$	$\chi^2(3, N = 1377) = 117.19,$ $p < .001$	$\chi^2(6, N = 1377) = 40.39,$ $p < .001$
Risk factor	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
PTSD in 1984	14.00 (9.34, 20.98) ^a	10.91 (7.17, 16.60) ^a	8.04 (5.07, 12.77) ^a	4.75 (2.88, 7.86) ^a
Pre-Vietnam				
Minority race	6.76 (1.93, 23.62) ^a	4.92 (1.44, 16.81) ^a	4.93 (1.44, 16.94) ^a	4.22 (1.20, 14.85) ^a
Age at entry into Vietnam	0.93 (0.83, 1.04)	0.93 (0.84, 1.04)	0.94 (0.84, 1.05)	0.93 (0.83, 1.04)
Vietnam combat exposure				
Medium versus low		2.00 (1.12, 3.58) ^a	1.70 (0.93, 3.09)	1.75 (0.95, 3.25)
High versus low		3.18 (1.74, 5.82) ^a	2.52 (1.34, 4.75) ^a	2.49 (1.29, 4.82) ^a
Post-Vietnam: Homecoming				
Perceived social support			1.00 (0.82, 1.21)	0.89 (0.73, 1.09)
Perceived negative community attitudes			1.12 (0.91, 1.38)	1.10 (0.89, 1.36)
Discomfort disclosing experiences			1.41 (1.11, 1.79) ^a	1.38 (1.08, 1.76) ^a
Post-Vietnam: 1984				
< high school education				0.86 (0.34, 2.14)
Live-in partner				1.21 (0.63, 2.34)
Community involvement				0.67 (0.52, 0.87) ^a
Alcohol use				1.01 (1.00, 1.01)
Depression symptoms				1.11 (1.02, 1.20) ^a
Anger				1.10 (1.02, 1.19) ^a

Note. PTSD = posttraumatic stress disorder; OR = odds ratio; CI = confidence interval.

^a95% CIs that do not include 1 are statistically significant.

1998 than were those who did not meet criteria in 1984. Risk factors for having PTSD at either time period significantly overlapped with those for PTSD course. Common risk factors included the severity of the trauma (high combat exposure), perceived negative community attitudes at homecoming, and greater depression and anger in 1984. Discomfort in disclosing Vietnam experiences was associated with having PTSD but not with course of PTSD. Two risk factors specific to course included minority status (associated with a more negative course) and more community involvement in 1984: Veterans who were more involved in the community in 1984 were also more likely to show remission in PTSD than were those with less community involvement. These results are consistent with previous research showing that poor social support is associated with greater risk of developing PTSD and a more chronic course of the disorder.

Our finding that minority race is associated with a more negative course for PTSD is consistent with other studies of Vietnam veterans (Kulka et al., 1990). The reasons minority veterans may be at risk for a more negative course of PTSD remain under debate. Minority individuals who served in the Vietnam theater may have higher levels of other pre- or posttrauma risk factors or may be differentially assigned to high combat roles. Unfortunately, the number of minority group members in our sample was too small to enable us to investigate these possibilities. The finding that minority status along with perceived negative community attitudes at

homecoming and lack of community involvement were risk factors for course of the disorder suggests that social stigma or exclusion from one's larger community plays a role in the persistence of PTSD (Shay, 1994). There is also the possibility that the actual combat experience of minority troops was more traumatic and intense than that of nonminority soldiers.

Depression symptoms and anger in 1984 were also risk factors for course of PTSD. One possible explanation for this finding is that elevated depression symptoms and anger may be markers for PTSD severity; veterans with more PTSD symptoms are probably also more depressed and angry. This possibility is consistent with research showing that Vietnam veterans with PTSD have higher levels of depression and anger than veterans without PTSD (Kulka et al., 1990). At the same time, depression (Freedman, Brandes, Peri, & Shalev, 1999) and anger (Foa, Riggs, Massie, & Yarczower, 1995; Riggs, Dancu, Gershuny, & Greenberg, 1992) have been associated with PTSD persistence in selected samples. Depression symptoms and/or anger might interfere with the confrontation with and processing of traumatic memories that appear to be necessary for recovery from the disorder (Foa & Rothbaum, 1998). Our data suggest that patient characteristics that predict negative treatment response, such as a high level of anger at the beginning of prolonged exposure (PE), might also be associated with more chronic PTSD in community samples.

Treatment Implications

The role of posttrauma factors in recovery from PTSD has not yet been thoroughly examined in the context of the theoretical model underlying the most widely studied empirically validated treatment for PTSD—PE (Foa & Rothbaum, 1998). This model suggests that PTSD symptoms are driven by avoidance of feelings, thoughts, and other triggers related to the traumatic event. Evidence to date suggests that exposure to the memory of the traumatic event reduces PTSD symptoms (Rothbaum, 2001). One possibility, therefore, is that individuals who do not avoid their experiences, who talk about them with others, and who have more social support after a traumatic event may be more likely to recover from their experiences and less likely to develop chronic PTSD. Our finding that poor perceived social support and perceived negative homecoming experiences contribute to chronic PTSD is consistent with this possibility and replicates findings in other military samples (Brewin et al., 2000; Engdahl et al., 1997). In addition, the possibility has rarely been explored that patient characteristics that predict negative treatment response, such as a high level of anger at the beginning of PE (Foa et al., 1995), might also be associated with more chronic PTSD in community samples.

Limitations

First, our conclusions are based on American Legionnaires who participated in surveys 14 years apart and can be considered to represent a “best-case” scenario in that they actively joined a veteran service organization and twice filled out a questionnaire. Many veterans suffering from PTSD might have been less likely to respond because one characteristic of this condition is distancing from social relationships (American Psychiatric Association, 1994). The extended time between discharge and the 1984 survey and between the 1984 and 1998 surveys increases the probability that the most impaired Vietnam veterans were not included in our study. Second, even within the American Legion, veterans with more PTSD symptoms in 1984 were less likely to participate in 1998. As a result, we might have lost some of the most chronically ill veterans at follow-up, thus reducing generalizability. The findings from this study also cannot be generalized to Vietnam veterans who are not members of the American Legion or to American Legionnaires of minority race. Risk factors for course of PTSD might differ for veterans not represented by our sample. Third, the first survey took place at least 13 years after the veterans returned from Vietnam, so immediate sequelae cannot be taken into account.

Moreover, although the use of survey methodology has many practical advantages, it also has several limitations that should be noted. First, the PTSD diagnosis was made according to a questionnaire and not validated by clinical interviews. Diagnosis focused on the presence of the disorder at two discrete points in time and was not a comprehensive survey of the veteran’s life history, so some individuals in the no-PTSD group might have had PTSD at another time in their lives that was missed. This would result in misclassification of these individuals and dilution of differences between the PTSD and no-PTSD groups and, hence, in underestimation of effects. Second, we used the *DSM-III-R* version of the PTSD criteria for consistency with the National Vietnam Veterans

Readjustment Study. The most current PTSD criteria are the *DSM-IV*. As the *DSM-IV* criteria require that the traumatic experience meet several subjective criteria (e.g., fear, helplessness, and horror) that we did not evaluate, we could not construct a *DSM-IV* diagnosis. It is possible that our results would have differed in a way difficult to predict had we assigned diagnoses with *DSM-IV* criteria.

Our examination of risk factors was limited by the space available in our survey, which also was directed at herbicide exposures. Important risk factors, such as family history of psychiatric illness, and exposure to other traumatic events, such as child abuse or assault, were not included in our models. Other risk factors, such as lack of perceived social support and perceived negative community attitudes, were assessed by means of single items that measure the veterans’ perceived social support. We are unable to assess whether these measures accurately represent the social support or community attitudes the veteran experienced or whether the operating factor is the veterans’ perceptions of support. Both perceived social support and perceived negative community attitudes were significantly correlated with co-occurring depression symptoms. However, these negative community attitudes continued to predict PTSD after depression symptoms were controlled. Finally, our assessments of combat exposure and post-Vietnam perceived social support are retrospective and, therefore, subject to recall bias. If individuals’ symptom chronicity influenced their reporting of combat exposure or other risk factors in 1984, this might inflate the association between these risk factors and persistence of PTSD. Although our combat reporting measure showed remarkable stability over a 14-year time period, recall bias may still have influenced exposure reporting.

Conclusions

Despite limitations, our study is unique because it is the only longitudinal study of a large, randomly sampled cohort of Vietnam veterans. Our findings provide further support for some well-documented risk factors for PTSD course and suggest some new areas for future research. After controlling for PTSD at Time 1, high combat exposure was the strongest predictor of PTSD persistence, once again documenting the significance of severity of traumatic exposure in risk for chronic PTSD. A primary interest in this study was the examination of whether post-Vietnam perceived social and community support was related to course of PTSD. The results indicate that recovery from PTSD may be significantly influenced by perceived level of community support—particularly perceived community attitudes and involvement. Further exploration of the role of social support in the onset and course of PTSD is warranted, particularly for war veterans who return from military conflict and must be reintegrated into society. Both public and private organizations interested in reducing postcombat psychopathology among military personnel may need to pay more attention to empowering veterans to access social and community support systems. In addition, the role of depression and anger in maintaining PTSD symptoms among trauma survivors in the community demands future attention. Researchers conducting interventions aimed at ameliorating PTSD course may wish to target depression and anger alone or in combination with approaches that target PTSD symptoms.

References

- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: Author.
- American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Boscarino, J. A. (1995). Post-traumatic stress and associated disorders among Vietnam veterans: The significance of combat exposure and social support. *Journal of Traumatic Stress, 8*, 317–336.
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748–766.
- Dohrenwend, B. P., Shrout, P. E., Egri, G., & Mendelsohn, F. S. (1980). Nonspecific psychological distress and other dimensions of psychopathology: Measures for use in the general population. *Archives of General Psychiatry, 37*, 1229–1236.
- Engdahl, B. E., Dikel, T. N., Eberly, R. E., & Blank, A. S. (1997). Posttraumatic stress disorder in a community group of former prisoners of war: A normative response to severe trauma. *American Journal of Psychiatry, 154*, 1576–1581.
- Figley, C. R. (1978). *Stress disorders among Vietnam veterans*. New York: Brunner/Mazel.
- Foa, E. B., Riggs, D. S., Massie, E. D., & Yarczower, M. (1995). The impact of fear activation and anger on the efficacy of exposure treatment for posttraumatic stress disorder. *Behavior Therapy, 26*, 487–499.
- Foa, E. B., & Rothbaum, B. O. (1998). *Treating the trauma of rape*. New York: Guilford Press.
- Freedman, S. A., Brandes, D., Peri, T., & Shalev, A. (1999). Predictors of chronic post-traumatic stress disorder: A prospective study. *British Journal of Psychiatry, 174*, 353–359.
- Frye, J. S., & Stockton, R. A. (1982). Discriminant analyses of post-traumatic stress disorder among a group of Vietnam veterans. *American Journal of Psychiatry, 139*, 52–56.
- Green, B. L., Grace, M. C., Lindy, J. D., Gleser, G. C., & Leonard, A. (1990). Risk factors for PTSD and other diagnoses in a general sample of Vietnam veterans. *American Journal of Psychiatry, 147*, 729–733.
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. (1995). Posttraumatic stress disorder in the national comorbidity survey. *Archives of General Psychiatry, 52*, 1048–1060.
- King, D. W., King, L. A., Foy, D. W., & Gudanowske, D. M. (1996). Prewar factors in combat related posttraumatic stress disorder: Structural equation modeling with a national sample of female and male Vietnam veterans. *Journal of Consulting and Clinical Psychology, 64*, 520–531.
- King, L. A., King, D. W., Fairbank, J. A., Keane, T. M., & Adams, G. A. (1998). Resilience/recovery factors in posttraumatic stress disorder among female and male Vietnam veterans: Hardiness, postwar social support, and additional stressful life events. *Journal of Personality and Social Psychology, 74*, 420–434.
- Kulka, R. A., Schlenger, W. E., Fairbank, J. A., Hough, R. L., Jordan, B. K., Marmar, C. R., & Weiss, D. S. (1990). *Trauma and the Vietnam War generation: Report of the findings from the National Vietnam Veterans Readjustment Study*. New York: Brunner/Mazel.
- McNally, R. J., & Shin, L. M. (1995). Association of intelligence with severity of posttraumatic stress disorder symptoms in Vietnam combat veterans. *American Journal of Psychiatry, 152*, 936–938.
- Op den Velde, W., Falger, P. R. J., Hovens, E. J. M., De Groen, J. H. M., Lasschuit, L. J., Van Duijn, H., & Schouten, E. G. W. (1993). Posttraumatic stress disorder in Dutch Resistance veterans from World War II. In J. P. Wilson & B. Raphael B (Eds.), *International handbook of traumatic stress* (pp. 219–230). New York: Plenum.
- Riggs, D. S., Dancu, C. V., Gershuny, B. S., & Greeberg, D. (1992). Anger and post-traumatic stress disorder in female crime victims. *Journal of Traumatic Stress, 5*, 613–625.
- Rothbaum, B. O. (2001, December). *Three controlled trials for PTSD: PE compared to (1) EMDR, (2) CPT, and (3) CR*. Symposium presented at the 17th Annual Meeting of the International Society for Traumatic Stress Studies, New Orleans, LA.
- Shay, J. (1994). *Achilles in Vietnam: Trauma and the undoing of character*. New York: Atheneum.
- Snow, B. R., Stellman, J. M., Stellman, S. D., & Sommer, J. F., Jr. (1988). Posttraumatic stress disorder among American Legionnaires in relation to combat experience in Vietnam: Associated and contributing factors. *Environmental Research, 47*, 175–192.
- Solomon, Z., Mikulincer, M., & Avitzur, E. (1988). Coping, locus of control, social support, and combat-related posttraumatic stress disorder: A prospective study. *Journal of Personality and Social Psychology, 55*, 270–285.
- Stellman, S. D., Stellman, J. M., & Sommer, J. F., Jr. (1988a). Combat and herbicide exposure in Vietnam among sample of American Legionnaires. *Environmental Research, 47*, 112–128.
- Stellman, S. D., Stellman, J. M., & Sommer, J. F., Jr. (1988b). Health and reproductive outcomes among American Legionnaires in relation to combat and herbicide exposure in Vietnam. *Environmental Research, 47*, 150–174.
- Stellman, S. D., Stellman, J. M., & Sommer, J. F., Jr. (1988c). Social and behavioral consequences of combat and herbicide exposure in Vietnam among American Legionnaires. *Environmental Research, 47*, 129–149.
- Stellman, S. D., Stellman, J. M., & Sommer, J. F., Jr. (1988d). Utilization, attitudes, and experiences of Vietnam era veterans with Veterans Administration health facilities: The American Legion experience. *Environmental Research, 47*, 193–209.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: Harper-Collins.
- Wolfe, J., Erickson, D. J., Sharkansky, E. J., King, D. W., & King, L. A. (1999). Course and predictors of posttraumatic stress disorder among Gulf War veterans: A prospective analysis. *Journal of Consulting and Clinical Psychology, 4*, 520–528.
- Zeiss, R. A., & Dickman, H. R. (1989). PTSD 40 years later: Incidence and person-situation correlates in former POWs. *Journal of Clinical Psychology, 45*, 80–87.

Received April 16, 2002

Revision received December 24, 2002

Accepted January 10, 2003 ■