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Analysis of Violent Behavior in Vietnam Combat Veteran Psychiatric Inpatients with Posttraumatic Stress Disorder

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This study tested the hypothesis that male Vietnam veterans seeking inpatient treatment for PTSD (n = 228) exhibit more violent behavior compared with a mixed diagnostic group of male psychiatric inpatients without PTSD (n = 64) and a community sample of Vietnam veterans with PTSD not undergoing inpatient treatment (n = 273). Violent acts assessed included property destruction, threats without a weapon, physical fighting, and threats with a weapon. PTSD inpatients engaged in more types of violent behavior than both comparison conditions. Correlates of violence among PTSD inpatients included PTSD symptom severity and, to a lesser degree, measures of substance abuse. These findings justify routine assessment of violent behavior among inpatients with PTSD, as well as application of specialized interventions for anger dyscontrol and aggression.

KEY WORDS: Vietnam veterans; PTSD; violence.

The Centers for Disease Control consider injuries resulting from interpersonal violence to be "one of the most important public health problems facing our country" (Rosenberg, O'Carroll, & Powell, 1992) and have placed a priority on prevention of violence among those at high risk (Koop & Lundberg, 1992; Rosenberg et al., 1992). Individuals with mental disorders, in particular, have been identified as being at considerable risk for committing acts of violence (see reviews by Tardiff, 1992; Marzuk, 1996; Volavka, 1995). In fact, most studies have found that individuals with psychiatric disorders exhibit more violent behavior than persons without mental disorders (Mazuk, 1996; Swanson, Holzer,

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Ganju, & Juno, 1990). Reports of the incidence of violent acts among mentally disordered individuals depend on a number of factors, including the time interval for assessment, the population sampled, and the criteria for measuring violence. However, research focusing on psychiatric inpatients has consistently shown that 8%–22% of this population had been assaultive within 2 weeks prior to hospitalization (Craig, 1982; Lagos, Perlmutter, & Saexinger, 1977; McNiel, Binder, & Greenfield, 1988; Rossi et al., 1986; Tardiff & Sweillam, 1980). Some specific psychiatric disorders—including substance abuse, schizophrenia, organic mental disorders, and personality disorders—have been associated with greater risk of violence than other disorders (Hodgins, Mednick, Brennan, Schulsinger, & Engberg, 1996; Swanson et al., 1990; Tardiff, 1992). However, the relationship between violence and specific diagnoses within psychiatrically impaired populations has yielded equivocal findings across studies and is not well-understood.

Posttraumatic stress disorder (PTSD) has not been included in most studies examining the prevalence and correlates of violence among psychiatric patients, perhaps because of its relatively recent inclusion in the diagnostic nomenclature. A number of investigators have reported strong associations between PTSD and various psychometric measures of anger and hostility in small samples of psychiatric patients (Chemtob, Hamada, Roitblat, & Muraoka, 1994; Lasko, Gurvits, Kuhne, Orr, & Pitman, 1994; McFall, Smith, Mackay, & Tarver, 1990), although the incidence of specific acts of violence was not studied. In the National Vietnam Veterans Readjustment Study (NVVRS), examining the epidemiology of PTSD among Vietnam veterans, Kulka et al. (1990) discovered alarmingly high rates of violence among a community sample of veterans with PTSD. In this study, 46% of combat veterans with PTSD committed at least one violent act during the 12 months prior to assessment, and 37% committed six or more acts. Moreover, the veterans with PTSD averaged over 13 acts of violence during the study interval, compared with 3.5 acts of violence for veterans without PTSD. Although informative about problems of violence among Vietnam veterans residing in the community, the NVVRS did not specifically study violence and its correlates among a population of veterans with PTSD undergoing psychiatric care.

Vietnam veterans seeking inpatient psychiatric care for PTSD may be particularly prone toward violence because of increased severity of symptoms requiring hospitalization. The primary purpose of this investigation was to test the hypothesis that violence among Vietnam veterans seeking specialized inpatient care for PTSD is more prevalent compared with (a) psychiatric inpatients without PTSD and (b) a community sample of Vietnam veterans with PTSD who have not undergone inpatient treatment. Psychiatric inpatients without PTSD control for effects of acute distress associated with hospitalization that may increase violence for reasons unrelated to PTSD, such as increased life stress or deterioration in functional status. The community sample of Vietnam veterans with PTSD provides a comparison group of individuals who, despite trauma exposure and PTSD, are not sufficiently distressed to seek inpatient treatment.

Patients with PTSD are not homogeneous in their proclivity for violence, as some individuals are clearly at greater risk than others. Effective clinical risk assessment practice (Borum, 1996) requires identification of statistical correlates associated with violent conduct, as well as understanding of base rates of violence in an index population. Indeed, individual differences in patient characteristics have been found to discriminate liability for violence in other clinical populations, providing clues for identifying high-risk individuals in need of specialized treatment (cf. Volavka, 1995). Therefore, a second objective of this study was to identify correlates of violence within PTSD inpatients across several domains of interest—including sociodemographic characteristics, functional status, psychopathology, and involvement in mental health treatment—in an effort to improve clinical risk assessment in this patient population.

Method

Participants

PTSD Patient Group. Participants in the PTSD study condition were 228 male Vietnam combat veterans admitted to the Evaluation/Brief Treatment PTSD Unit (EBTPU) of the VA Puget Sound Health Care System—Seattle Division. Their average age was 46.32 (SD = 2.49) years. Over 80% of participants had completed the equivalent of 12 years of education (M = 13.6, SD = 2.17); 37% were married; and fewer than 12% were employed at the time of admission to the program. The ethnic composition of the sample included 70% Caucasians, 12% African Americans, 10% Native Americans, 5% Hispanics, 1% Asians, and 2% "other." Over 50% of the PTSD study sample had a service-connected disability rating from the VA, for impairment associated with combat-related PTSD.

PTSD patients reported that they had been exposed to friendly or hostile incoming fire from small arms, artillery, rockets, mortars, or bombs during their war zone service in Vietnam. Revised Combat Exposure Scale (RCES) scores (Gallops, Laufer, & Yager, 1981), obtained on an unbiased subsample of 64 men, ranged from 5 to 14 and averaged 10.3 (SD = 2.34). Moreover, 25% of these men stated that they had observed war zone atrocities (without participating), and 43% acknowledged participation in atrocities. All participants in this program were diagnosed as meeting *DSM–III–R* criteria for PTSD, based on a standard clinical interview conducted by an attending psychiatrist. Additionally, patients endorsed an average of 9.62 (SD = 1.29) symptoms on a brief, 11-item version of the Mississippi Scale for Combat-Related PTSD (M–PTSD; Fontana & Rosenheck, 1994). Patients' mean total score on this measure was 41.06 (SD = 5.13), which exceeds normative values (M = 38.45, SD = 7.92) established for veterans' in outpatient treatment for PTSD (Fontana & Rosenheck, 1994). The brief M–PTSD is

internally consistent ($\alpha = .83$), and correlates highly ($r = .89$) with the 35-item original version developed by Keane and his colleagues (Fontana & Rosenheck, 1994). (Full-scale, 35-item, M–PTSD scores were available on an unbiased sample of 49 patients, who obtained a mean score of 133.22, $SD = 15.98$.) Comorbid mental disorders were diagnosed in 91% of PTSD study participants ($M = 1.88$, $SD = 1.13$ diagnoses in addition to PTSD). Eighty-nine percent had additional Axis I disorders ($M = 1.69$, $SD = 1.06$), including alcohol abuse–dependence (54%), affective disorder (other than bipolar; 43%), drug abuse–dependence (32%), psychotic disorder (13%), bipolar disorder (8%), anxiety disorder (other than PTSD) (5%), dissociative disorder (5%), and adjustment disorder (3%). Nineteen percent of the study sample were diagnosed with personality disorders, including antisocial (5%), borderline (5%), mixed (4%), and other (5%).

Comparison Group of Psychiatric Inpatients Without PTSD. A sample of 64 male psychiatric inpatients hospitalized at the VA Puget Sound Health Care System—Seattle Division served as a comparison group in this study. Thirty-three (52%) of these patients were admitted to a general psychiatry acute care unit, and 31 (48%) received care on an inpatient substance abuse treatment ward. This sample was selected from a pool of patients, consecutively admitted to these units who met the following criteria: (a) military service during the Vietnam era (1964–1973), (b) no history of service in a war zone theater of operations, and (c) absence of PTSD, organic mental disorder, or acute symptoms of psychosis or agitation that would prevent patients from reliably completing the study questionnaire. Participants in this condition averaged 46.84 ($SD = 4.75$) years of age and were of Caucasian (78%), African American (19%), or Asian or Hispanic (3%) descent. Lifetime exposure to a range of traumatic stressors was assessed using an inventory used in the National Comorbidity Survey (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). On this 12-item scale, participants reported being exposed to an average of 3.86 ($SD = 2.62$) stressful events. Many of these traumatic stressors involved exposure to acts of violence, such as being raped (6%); sexually molested (23%); attacked or assaulted (53%); physically abused (23%); threatened with a weapon, held captive, or kidnapped (45%); and witnessing someone being badly injured or killed (55%). Discharge diagnoses assigned by attending psychiatrists for this sample included drug abuse–dependence (53%), alcohol abuse–dependence (53%), affective disorders (other than bipolar; 42%), bipolar disorder (14%), psychotic disorders (8%), and anxiety disorders (8%). Axis II disorders were diagnosed among 9% of patients and included borderline (3%), narcissistic (2%), antisocial (2%), and mixed (2%). Patients in this condition received an average of 1.91 ($SD = .89$) *DSM–IV* diagnoses.

Patients in the PTSD and non-PTSD inpatient samples were assigned a *DSM–IV* Global Assessment of Functioning (GAF) Scale score by their attending psychiatrist, reflecting degree of impairment in psychosocial status at the time of admission. GAF scores were not significantly different between groups ($M = 40.80$, $SD = 12.32$ for PTSD; $M = 39.31$, $SD = 15.89$ for non-PTSD;

$t < 1$), indicating equivalent symptomatic distress or functional impairment at the time of admission.

Community Residents with PTSD. A sample of 273 male Vietnam veterans with PTSD, who had never been hospitalized on a VA inpatient psychiatry unit, was derived from the data set of the NVVRS (Kulka et al., 1990). The NVVRS was designed to assess the prevalence of PTSD-related problems and use of mental health care in a nationally representative sample of Vietnam veteran community residents. Cases from the NVVRS database selected for this study were comparable with the inpatient PTSD sample in level of war zone trauma exposure (RCES score $M = 10.06$, $SD = 3.31$; 57% participated in atrocities and 21% witnessed atrocities). They were identified as having PTSD, as measured by the 35-item version of the M–PTSD, and had no history of inpatient VA psychiatric care. A cutoff score of 89 was used to select participants, based on research showing high diagnostic sensitivity (92%) and specificity (84%) of the M–PTSD relative to structured clinical interview assessment in the original NVVRS validation study (Kulka et al., 1988). NVVRS study participants obtained an average score of 103.60 ($SD = 13.62$) on the 35-item version of the M–PTSD, and they averaged 32.33 ($SD = 5.04$) on the brief M–PTSD. Identifying characteristics of the sample participating in this landmark study are described in the original NVVRS report (Kulka et al., 1988, 1990).

PTSD inpatients were compared with the NVVRS sample on the 11-item brief M–PTSD (Fontana & Rosenheck, 1994). Predictably, PTSD inpatients endorsed more severe PTSD symptoms compared with community residents with PTSD, $t(494) = 5.56$, $p < .001$). The NVVRS sample averaged 39.99 ($SD = 3.93$) years of age at the time of that study was conducted, which is about 6 years younger than the average age for PTSD inpatients recruited into this project.

Assessment of Violence

Violent acts within the PTSD and non-PTSD psychiatry inpatient samples were measured by patient self-report on a questionnaire administered during hospitalization. Four domains or types of violent acts were assessed, including property destruction, threats of violence without a weapon, physical fighting, and violent threats with a weapon. These content domains were abstracted from items measuring violence in the NVVRS, which had been previously derived from the Conflict Tactics Scale (CTS; Straus, 1979). The occurrence of violent acts during the 4-month interval prior to patients' hospitalization was queried by the following items, to which patients responded by answering "yes" or "no":

> "The following is a list of some things that you may have done when you had a quarrel with someone else. Did you do any of these in the past four months?"
>
> (a) Destroy property?
>
> (b) Threaten someone with physical violence (without a weapon)?

(c) Have a physical fight with someone?
(d) Threaten someone with a weapon?

Additionally, a global measure of self-reported violence was obtained, by instructing clinicians who administered the questionnaire to determine if patients had experienced "trouble controlling violent behavior in the past 30 days" (scored "yes" or "no"). All sources of information available to clinicians administering the questionnaire were used to score this item, including direct interview of the patient and review of medical records.

Violence in the NVVRS sample of community residents with PTSD was assessed by nine items adapted from the CTS. The NVVRS version of CTS items included violent acts occurring in any interpersonal context, rather than family violence exclusively. Items that corresponded with the four types of violence assessed in the PTSD and psychiatric samples in this study were identified. The NVVRS item that corresponded to property destruction was phrased as "how often did you take out your anger by kicking things, like a chair, giving a door a good slam, punching the wall, or looking for something to throw or smash?" The item matching threats of violence without a weapon was "how often did you threaten to hit or throw something at someone?" The domain of physical fighting was assessed in the NVVRS by a question about episodes of "kicking, biting, or hitting someone with a fist." Finally, the NVVRS item that corresponded to violent threats with a weapon was "how often did you threaten someone with a gun or knife?" In the NVVRS violence index, participants were asked to record the frequency with which they engaged in these behaviors during the past year. For consistency of scaling with the measure administered in this study, NVVRS data were transformed to dichotomous scores, where 0 = *never* and 1 = *one or more occurrences of the index behavior.*

Measures of Individual Differences Correlated with Violence

Data for the PTSD inpatient sample were gathered in accordance with the national outcome monitoring protocol for VA specialized inpatient PTSD treatment programs, implemented by the Northeast Program Evaluation Center (NEPEC). The NEPEC evaluation protocol consists of a variety of standardized instruments described elsewhere (Fontana & Rosenheck, 1997; Fontana, Rosenheck, Spencer, & Gray, 1995). These instruments were used in this study to collect information on a broad range of variables pertaining to sociodemographic characteristics, functional status, psychopathology, and mental health treatment involvement prior to hospitalization. Variables abstracted from NEPEC instruments that served as correlates of violence in this study are presented in Table 1.

Assessment of Sociodemographic, War Zone, and Treatment Involvement Variables. Numerically coded information pertaining to sociodemographic variables, preliminary clinical diagnoses, and mental health treatment history was

Table 1. Variables Related to Violence Among PTSD Inpatients ($n = 228$)

Variable	Statistical Test
Sociodemographic Variables	
Age	$r = -.12$
Currently married	$t < 1$
Race (White vs. non-White)	$t < 1$
African American	$t < 1$
History of being jailed for any offence	$t < 1$
Grades of education completed	$r = -.02$
War Zone Trauma Exposure Variables	
Degree of combat exposure	$r = .11$
Participant or observer in war zone atrocities	$t(203) = 2.32^{b,**}$
Functional Status Variables	
VA disability rating for medical disorder(s)	$t < 1$
VA disability rating for PTSD or other psychiatric condition(s)	$t < 1$
Employed at time of hospitalization	$t < 1$
Money received from employment 30 days before admission	$r = -.04$
Possession of a valid drivers license	$t(226) = 1.17$
Availability of a car for personal use	$t < 1$
Living alone	$t < 1$
Global Assessment of Functioning Scale score	$r = .14$
Measures of Psychopathology and Substance Abuse	
Number of mental disorders diagnosed	$r = -.04$
PTSD symptom severity[a]	$r = .41^{**}_{b}$
Comorbid anxiety disorder diagnosed	$t < 1$
Depressive disorder diagnosed	$t(225) = 1.93^{*}$
Bipolar disorder diagnosed	$t < 1$
Psychotic disorder diagnosed	$t < 1$
Substance use disorder diagnosed	$t(226) = 2.04^{*}$
Personality disorder diagnosed	$t < 1$
Number of different types of drugs abused before admission	$r = .20^{**}$
Days of drug dependence symptoms 30 days before admission	$r = .16^{**}$
Troubled by drug problems 30 days before admission	$r = .16^{**}$
Days intoxicated 30 days before admission	$r = .20^{**}$
Days of alcohol dependence symptoms 30 days before admission	$r = .27^{b,**}$
Days drinking 30 days before admission	$r = .19^{**}$
Troubled by alcohol problems 30 days before admission	$r = .21^{**}$
History of suicide attempts	$r = .10$
Treatment Involvement Variables	
Lifetime history of outpatient mental health treatment	$t < 1$
Lifetime history of psychiatric hospitalization	$t < 1$
Enrolled in outpatient PTSD treatment before admission	$t < 1$
Enrolled in outpatient substance abuse treatment before admission	$t < 1$
Taking medications for a psychiatric disorder prior to admission	$t(225) = 1.44$
Length of hospitalization (in days) in the EBTPU	$r = -.04$

Note. PTSD = posttraumatic stress disorder; EBTPU = Evaluation/Brief Treatment PTSD Unit. Variables are positively related to increased violence as measured by the 5-item composite index in all statistically significant comparisons reported, except for the comparison involving depression where nondepressed patients were more violent.

[a] PTSD was measured by patients' total score on the 11-item brief M-PTSD.

[b] Statistically significant at the $p < .05$ level after Bonferroni corrections were made for the number of nonindependent contrasts (Kirk, 1968).

$^{*}p < .05$, one-tailed. $^{**}p < .01$, one-tailed.

derived from the PTSD Screening Form (PSF) and the War Stress Interview—Admissions Supplement (WSI). A technician administered the 60-item PSF and the 13-item WSI upon patients' admission to the EBTPU, based on information derived from chart review and patient interview. Involvement in atrocities was measured by asking patients, during administration of the PSF, if they had "ever observed others or participated yourself in atrocities, such as torturing prisoners, mutilating enemy bodies, or harming civilians." Responses to this item were scored "did not occur," "observed others," "participated," or "don't know/refused to answer." Combat exposure was assessed separately using the 10-item RCES (Gallops et al., 1981), which has been validated against military records of trauma occurrence (Watson, Juba, & Anderson, 1989).

Assessment of Psychopathology and Functional Status. Within 2 days of admission to the EBTPU, patients were administered the War Stress Intake Questionnaire (WSIQ). The WSIQ is a 51-item self-report instrument asking patients to rate their status in a number of domains, including PTSD symptoms, history of suicide attempts, military and homecoming experiences, drug and alcohol use, medical problems, employment, and other forms of socioeconomic support reflecting functional status. The WSIQ measure of alcohol and drug abuse was adapted from the Addiction Severity Index (McLellan, Parikh, & Bragg, 1990). The PTSD symptom scale of the WSIQ consisted of an 11-item abbreviated version of the self-administered Mississippi Scale for Combat-Related PTSD (Fontana & Rosenheck, 1994), as well as four items written specifically to assess reexperiencing, numbing–avoidance, and physiological arousal symptom domains of PTSD. Upon discharge from the hospital, the coordinator (psychologist, social worker, or nurse) assigned to each patient recorded information pertaining to discharge diagnoses, treatment modalities administered, treatment outcome, and disposition arrangements on the 47-item PTSD Discharge Process Form (PDPF).

Results

Comparison of Study Samples on Measures of Violence

The four items measuring types of violence and the global rating of violence were subjected to a principal components analysis. A single component was extracted, and all items loaded at least moderately on this component (property destruction = .65; threats of violence without a weapon = .80; physical fighting = .71; violent threats with a weapon = .64; and global violence in past 30 days = .68). Given that these items measure a unitary dimension of violence, a composite score was formed, based on the sum of all five items. PTSD inpatients endorsed a significantly greater number of items on this composite measure than did psychiatric inpatients without PTSD (PTSD $M = 2.44$, $SD = 1.58$; non-PTSD $M = .77$, $SD = 1.37$), $t(290) = 7.71$, $p < .001$.

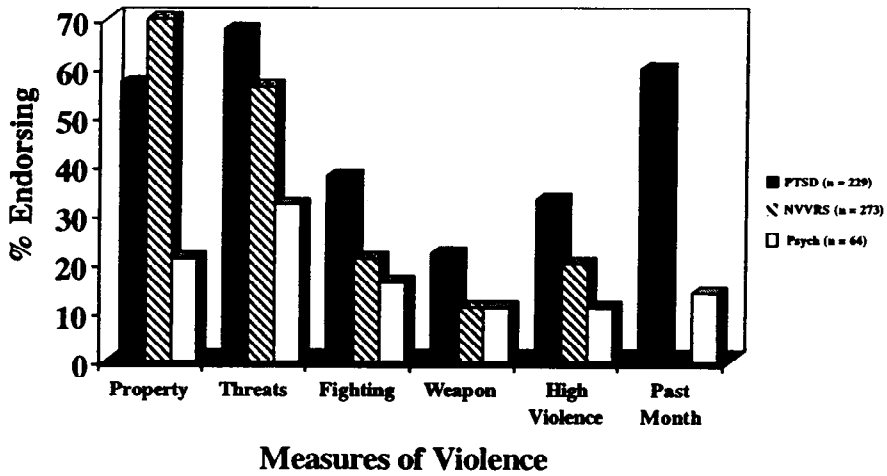

Fig. 1. Violence among PTSD inpatients, NVVRS community residents, and psychiatry inpatients. Property = property destruction; Threats = threats of violence without a weapon; Fighting = physical fighting; Weapon = violent threats with a weapon; High Violence = endorsement of 3 or 4 types of violence; Past Mo. = trouble controlling violence within the past 30 days. PTSD and psychiatry inpatients endorsed violent acts as they occurred within a 4-month time frame, whereas the NVVRS sample was queried about acts of violence over a 1-year period.

Figure 1 compares the percentage of participants in each condition on measures of violence used in this study. Odds ratios (OR) were computed for each measure in order to compare the odds of violence in PTSD inpatients relative to the odds of violence for comparison groups. Chi-square tests were performed to determine if odds ratios were significantly different from one (Fisher & van Belle, 1993). Bonferroni corrections were used to adjust an alpha level of $p < .05$ (one-tailed) for all comparisons made involving each measure (Kirk, 1968).

PTSD inpatients were significantly more likely than psychiatric inpatients without PTSD to have engaged in one or more acts of violence during the 4-month period prior to hospitalization (79% for PTSD vs. 33% for controls; $OR = 7.40$, $p < .001$). Specifically, PTSD inpatients were more likely to destroy property ($OR = 5.78$, $p < .001$), threaten others without a weapon ($OR = 6.45$, $p < .001$), become involved in physical fighting ($OR = 4.17$, $p < .001$), and make violent threats with a weapon ($OR = 3.22$, $p < .01$). Patients within PTSD and non-PTSD inpatient comparison samples were classified as having severe problems with violence if they endorsed at least three of the four types of violent acts measured. The proportion of PTSD inpatients falling into this "high violence" category was significantly greater than was the proportion of inpatients with disorders other than PTSD ($OR = 4.45$, $p < .001$). Finally, on the clinician-administered global rating, PTSD patients reported that they had significantly greater trouble controlling

violence during the 30 days prior to hospitalization compared with inpatient controls ($OR = 9.50$, $p < .001$).

PTSD inpatients were compared with the NVVRS sample of community residents with PTSD on measures of the four types of violence. A significantly greater proportion of PTSD inpatients endorsed items assessing threats of violence without a weapon ($OR = 1.68$, $p < .01$), physical fighting ($OR = 2.44$, $p < .001$), and violent threats with a weapon ($OR = 2.25$, $p < .001$). However, the NVVRS sample was more likely than PTSD inpatients to have endorsed property destruction ($OR = 0.57$, $p < .01$). On a composite index of these four violence items, PTSD inpatients were significantly more violent than NVVRS comparison participants, $t(494) = 2.37$, $p < .01$. PTSD inpatients were nearly twice as likely to be classified in the "high violence" category than were NVVRS participants, based on their report of having engaged in at least three different types of violent behavior ($OR = 1.96$, $p < .001$).

Correlates of Violence in PTSD Inpatients

A series of analyses was conducted in order to identify characteristics of patients related to their total scores on the 5-item composite measure of violence. Table 1 lists patient characteristics examined and the results of statistical analyses performed. The table reports uncorrected significance values as well as values where a Bonferroni correction was used to adjust an alpha level of $p < .05$ for the number of nonindependent tests performed (Kirk, 1968). Uncorrected significance values were reported because stringent control for Type I error increases risk for failing to detect meaningful associations (i.e., Type II error). (Eleven tests were statistically significant, but only two of these could be expected to be significant by chance.)

The 11 variables showing statistically significant (uncorrected) results were entered into a hierarchical linear multiple regression equation. This analysis was performed in order to determine the unique contribution of PTSD to variance in violence, after accounting for variance from other independent variables. Hierarchical regression was selected because it controls for multicollinearity between independent variables, as observed in Table 2. As expected, several substance use items correlated highly with one another, whereas the remaining variables showed low intercorrelations. Variables were entered hierarchically in four steps in the following order: war zone atrocities, substance use, depression, and PTSD. The war zone atrocity variable was entered first, because it presumably occurred prior to onset of mental disorders currently present in patients. Substance use variables were entered prior to depression, because *DSM–IV* requires effects of substance use to be accounted for prior to diagnosing depression (American Psychiatric Association, 1994).

Table 3 summarizes results of the regression analysis. The resulting multiple R of .51 was statistically significant, $F(11, 192) = 6.04$, $p < .001$. As each block

Table 2. Intercorrelation of Predictors Included in Multiple Regression Analysis ($n = 228$)

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Atrocities	—	.04	.14	.17	.17	.20	.03	.01	.01	−.12	.21
2. Substance abuse diagnosis		—	.33	.31	.29	.25	.25	.19	.23	−.01	.21
3. Troubled by alcohol symptoms			—	.45	.72	.50	.23	.33	.31	−.05	.21
4. Number of days drinking				—	.34	.82	.30	.14	.10	−.00	.14
5. Alcohol dependence symptoms					—	.39	.28	.49	.38	−.08	.21
6. Number of days intoxicated						—	.30	.20	.14	.02	.15
7. Number of different drugs used							—	.60	.51	−.05	.25
8. Drug dependence symptoms								—	.82	−.02	.27
9. Troubled by drug problems									—	−.03	.25
10. Depression diagnosis										—	.04
11. PTSD symptoms											—

Note. PTSD = posttraumatic stress disorder.

Table 3. Hierarchical Linear Multiple Regression Analysis: Final Model Involving Variables Related to Violence

Variable	*B*	*SE*	*β*
Block 1			
Involvement in atrocities	.01	.24	.02
Block 2			
Substance use diagnosis	−.11	.23	−.03
Troubled by alcohol problems	.01	.11	−.07
Days spent drinking alcohol	.00	.02	−.09
Alcohol dependence symptoms	.01	.02	.23*
Days intoxicated	.00	.02	.17
Drug dependence symptoms	.00	.03	−.20
Troubled by drug problems	.15	.15	.11
Number of drugs used	.00	.01	.13
Block 3			
Depression diagnosis	−.01	.16	−.02
Block 4			
PTSD symptom severity	.12	.21	.40**

Note. $R^2 = .26$ for final model.
$^*p < .05$. $^{**}p < .001$.

was added to the regression model, the change in R^2 was small but statistically significant for atrocities (R^2 change = .03, $p < .05$) and substance use (R^2 change = .09, $p < .01$), but no significant effects were found for depression (R^2 change = .00, *ns*). When PTSD was added to the model, the change in R^2 was greatest and accounted for 54% of the explained variance in violent behavior (R^2 change = .14, $p < .001$). It is possible that degree of exposure to war zone violence, rather than PTSD, explained participants' subsequent violence. To test this possibility, a separate hierarchical regression analysis was performed, by first adding combat exposure, then atrocities, and finally PTSD in prediction of violence. The multiple R of .48 was statistically significant, $F(3, 58) = 5.53$, $p < .01$. Standardized

regression coefficients from this analysis are as follows: combat exposure (β = .16, *ns*), atrocities ($\beta = -.15$, *ns*), and PTSD symptom ($\beta = .47$, $p < .001$). PTSD symptom severity was a significant predictor of violence in both multiple regression analyses, even after accounting for effects of exposure to war zone violence and comorbid psychopathology.

The salience of PTSD symptom severity in predicting violence among variables studied suggested the potential usefulness of an additional analysis examining the differential relationship of PTSD symptom clusters with violence. Items from the brief M-PTSD were classified by the investigators as measuring either reexperiencing symptoms of PTSD, symptoms of avoidance–numbing, or symptoms of heightened physiological arousal. These items, together with four additional items from the WSIQ written specifically to assess symptom dimensions of PTSD, were summed to form subscales that were entered into a hierarchical linear regression equation. The multiple R of .41 from this analysis was statistically significant, $F(3, 224) = 15.48$, $p < .001$. The avoidance–numbing symptom cluster was most strongly related to violence ($\beta = .32$, $p < .001$), followed by the symptom cluster measuring physiological arousal ($\beta = .17$, $p < .01$). The contribution of the reexperiencing symptom cluster to violence was not statistically significant ($\beta = -.02$, *ns*).

Discussion

This investigation demonstrated that Vietnam combat veterans seeking specialized inpatient treatment for PTSD report more interpersonal violence prior to hospitalization, compared with a mixed diagnostic group of psychiatric inpatients without PTSD. Moreover, a significantly greater proportion of PTSD inpatients were classified as highly violent compared with psychiatric inpatients without PTSD. Differences in violence emerged between these two patient groups, despite their equivalence in global distress and functional impairment at the time of admission.

The group of psychiatric patients without PTSD used in this study was relatively small, and exclusion criteria may have rendered the sample unrepresentative of other acute inpatients. Nevertheless, violence reported by this comparison sample was consistent with prehospitalization base rates of violence established for psychiatric inpatients in other research (Craig, 1982; Lagos et al., 1977; McNiel et al., 1988; Rossi et al., 1986; Tardiff & Sweillam, 1980). The occurrence of self-reported violence in both inpatient samples studied here is alarmingly high, with risk being greatest among inpatients with Vietnam combat-related PTSD. Based on these findings, clinicians are justified in carefully assessing for the probability of recent violence among veterans seeking help for PTSD and are encouraged to administer specialized treatments for anger dyscontrol and aggression (Chemtob, Novaco, Hamada, & Gross, 1997; Tardiff, 1992).

Comparisons between PTSD inpatients and NVVRS community residents with PTSD revealed greater self-reported violence, in the former group, on three of the four measures of interpersonal aggression. PTSD inpatients were also more likely to fall into the high violence category compared with NVVRS participants. These findings emerged despite the fact that violence was assessed during a 4-month time interval for PTSD inpatients, compared with a 12-month time interval for the NVVRS community resident sample. NVVRS participants were more likely to have destroyed property than PTSD inpatients, possibly because the longer assessment period for NVVRS participants permitted more opportunity for an aggressive act to occur. Also, the item measuring property destruction in the NVVRS may have captured a broader range of aggressive behaviors, as it did not restrict the occurrence of property destruction to a context involving interpersonal disputes. The more inclusive instrumentation used to measure violence in the NVVRS sample nevertheless limits direct comparison of findings across conditions, which represents a shortcoming of the present study. The NVVRS community sample was included to assess whether factors associated with the need for hospitalization among veterans with PTSD increase liability for violence over and above presence of trauma exposure and PTSD symptoms alone. Exactly what the operative factors that increase risk for violence consist of, however, cannot be determined from this study. The fact that veterans seeking inpatient care experienced greater severity of PTSD symptoms than the NVVRS sample, as measured by the M–PTSD, may possibly explain their greater violence.

Measures of sociodemographic variables, functional status, and treatment involvement did not add to the improvement of clinical risk assessment among PTSD inpatients. Sociodemographic variables have typically not been consistently related to violence in most epidemiological studies performed on representative samples of community residents and psychiatric patients (Craig, 1982; Fulwiler, Grossman, Forbes, & Ruthazer, 1997; McNeil et al., 1988; Swanson et al., 1990; Swett & Mills, 1997; Tardiff & Sweillman, 1980), with the exception of low socioeconomic status and age. These variables may have been of limited value in the present study because they are generally poor predictors of violence, or because of truncated variance specific to this homogeneous sample of PTSD inpatients. Our expectation that greater functional status would reduce propensity toward violence was not confirmed. Again, the restricted range of variance in the study sample, owing to a high and uniform level of functional impairment, may explain this result, along with possible insensitivity of measures of functional status used in this study.

Prior research has shown that hospitalization produces at least short-term reduction of violence among PTSD patients (Fontana & Rosenheck, 1997). However, in this study, preadmission violence among PTSD patients was not attenuated by prior hospitalizations or current involvement in outpatient care, including pharmacological treatment. One possible explanation for this apparent contradiction is that prior episodes of hospitalization may not have provided long-lasting prophylaxis against violent behavior in our study sample and that outpatient care was simply

insufficient to deter acts of aggression. An implication of this interpretation is that recurrent, episodic access to inpatient treatment may be an important intervention for problems of violence among Vietnam veterans with chronic PTSD.

Regression analyses demonstrated that PTSD explained a significant share of variance in violent behavior among inpatients with PTSD, even after effects of trauma exposure and symptoms of substance use and depression were accounted for. Although the predictive model accounted for only a modest amount of variance in violence, PTSD explained considerably more variance than did symptoms of substance use and depression. The preponderance of evidence in violence research shows that "major mental disorders" are associated with increased risk of violence (Hodgins et al., 1996; see reviews by Mulvey, 1994 and Volavka, 1995) and that substance use augments this risk among mentally ill individuals (Swanson et al., 1990). In these studies, "major mental disorders" have generally referred to schizophrenia, bipolar disorder, and organic mental disorders, with PTSD often excluded from analysis. Results from this investigation are consistent with prior research showing that substance use increases liability for violence among patients with mental disorders. However, they indicate that risk for violence may not be correlated with other mental disorders or the total number of mental disorders diagnosed, among Vietnam veteran inpatients with PTSD. Our findings suggest that PTSD, at least among a selected population of patients, should be considered for inclusion among the list of mental disorders increasing propensity for violence.

The mechanisms mediating the link between PTSD and violence found in this study are unknown. Previous research showing strong associations between PTSD and anger arousal in veterans with PTSD implicate deficits in regulation of anger arousal and impulsivity, impaired cognitive appraisal processes, and stereotyped behaviors for coping with threat (Chemtob, Novaco, Hamada, Gross, & Smith, 1997). PTSD symptoms measuring heightened physiological arousal, including anger, were significantly correlated with violence in this study, supporting the contention that arousal characteristics of the disorder play a mediational role in aggression. Also noteworthy was the finding that symptoms of avoidance–numbing were significantly associated with violence—in fact, more so than reexperiencing and arousal symptom clusters. The relationship between anger and emotional numbing has been supported in two separate factor analytic studies of PTSD symptoms, both of which found items of emotional numbing and anger to load on the same dimension (Foa, Riggs, & Gershuny, 1995; Silver & Iacono, 1984). Additional research involving a large sample of substance abusers found that coping styles marked by escape, avoidance, and distancing were significantly correlated with measures of aggression and hostility (McCormick & Smith, 1995). The association of emotional numbing and excessive anger arousal, and its potential role in mediating propensity to violence, deserves systematic inquiry.

The possibility that exposure to war zone violence increases subsequent aggression, independent of PTSD, was not supported by this investigation. PTSD symptom severity accounted for considerably more variance in violence than did

combat exposure and involvement in atrocities, neither of which were significantly related to violence in regression analyses. Moreover, both comparison groups, despite extensive exposure to trauma of a violent nature, exhibited less violence than that characteristic of inpatients with PTSD.

Future research into violence in PTSD should improve on some of the methodological deficiencies of the current study. Diagnoses and GAF ratings were rendered in this study by board certified psychiatrists, based on multiple assessment contacts with patients during their hospitalization and behavioral observations provided by other professionals. However, the reliability of diagnoses and GAF score assignments were not evaluated and use of structured diagnostic interviews would have improved standardization of diagnostic methods. Measures of violence used in this study were limited to patients' self-report responses and should be expanded to include reports by collaterals, as well as behavioral indexes of violence (e.g., arrests). Although questions assessing violence are part of the NEPEC national program evaluation protocol, and were adapted from the NVVRS, the reliability and validity of these specific items have not been thoroughly studied. Correlates of violence in this study were restricted to a limited domain of variables, which may explain the fact that regression analyses explained only a modest amount of variance. A number of additional measures hold promise for discriminating individuals prone toward violent behavior and should be included in future multivariate studies of aggression (e.g., history of previous violence, anomalies in developmental history, and deficits in cognitive and neuromotor functioning). Results of this study are based on correlation of data gathered retrospectively on VA inpatients with PTSD and may not generalize to more representative samples of veterans with PTSD. These findings may nevertheless encourage research identifying patients with PTSD who are at high risk for violence and who need specialized assessment and intervention.

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