Primary Psychiatry. 2006;13(3):51-56

Post-Deployment Violence and Antisocial Behavior:

The Influence of Pre-Deployment Factors, Warzone Experience, and Posttraumatic Stress Disorder

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ABSTRACT

The United States has historically been concerned with successful reintegration of returning combat veterans into civilian society. Apprehensions are based on the recognition that traumatic warzone exposures may have negative emotional and behavioral consequences, and that violent and aggressive behavior demonstrated in the combat zone may persist upon homecoming. The majority of clinical and empirical data on post-deployment violence and antisocial behavior in US combat veterans comes from studies of returnees from the Vietnam War. These studies have demonstrated correlations between warzone exposures, posttraumatic stress disorder, and post-deployment violence in subpopulations of Vietnam veterans; however, there are methodologic limitations to the generalizability of these findings. Study results regarding post-deployment violence and antisocial behavior in Vietnam veterans can inform efforts to mitigate violence and antisocial behavior in service members returning from combat related to the global war on terrorism as well as future research.

INTRODUCTION

The United States has long held concerns about its military service members returning from war.[1,2] Apprehension surrounding the prospects for soldiers' successful reintegration into society has stemmed from concerns about the persistence of aggressive behav-

Needs Assessment: In combat veterans, violent or aggressive behavior emerging as an adaptive response on the battlefield often persists upon homecoming. Clinical and empirical studies of combat veterans from Vietnam demonstrate that post-deployment antisocial behavior correlates with a number of pre-military experiences, certain aspects of warzone exposure, and the development of posttraumatic stress disorder. The lessons learned from these studies, as well as an understanding of the limitations of these studies, will help in assessing and mitigating violence and antisocial behavior in returning service members.

Learning Objectives:

- Discuss major study findings of the effects of combat deployment on post-deployment violence and antisocial behavior.
- Identify the limitations of these studies concerning post-deployment behavior of service members returning from combat operations.
- Recognize the relative contributions of pre-deployment behavior, warzone experiences, and posttraumatic stress disorder to the emergence of violence and antisocial behavior.

Target Audience: Primary care physicians and psychiatrists.

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Disclosure: Drs. Benedek and Grieger report no affiliation with or financial interest in any organization that may pose a conflict of interest.

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ior (that may be adaptive on the battlefield) and from concerns related to the potential behavioral and emotional consequences of traumatic battlefield exposures. A variety of clinical and empirical studies have examined the relationships between battlefield exposures and the development of mental disorders such as posttraumatic stress disorder (PTSD) and depression. Other studies have examined the effects of warzone experience on the development of post-deployment violence, aggression, and other antisocial behavior. Recent statistical analyses have attempted to model the extent to which PTSD itself may mediate the development of post-deployment antisocial behavior in the aftermath of deployment.

The prevalence and management considerations for combat-related PTSD have been described elsewhere in this issue.[3] This article reviews the literature surrounding efforts to identify predictors of violence and antisocial behavior in returning war veterans with and without PTSD. Literature describing the relationship between PTSD and post-deployment violence, aggression, and antisocial behavior is summarized as well. Finally, studies attempting to delineate the effects of pre-deployment behavior, combat exposure, and PTSD as mediators of post-deployment antisocial behavior are reviewed.

ANTISOCIAL BEHAVIOR IN VETERAN POPULATIONS

Studies of postwar adjustment of Vietnam veterans have provided the vast majority of information concerning violence and antisocial behavior in returning soldiers. Yesavage[4] collected data on 70 consecutive Vietnam era schizophrenic male patients admitted to the psychiatric intensive care unit of the Veterans Administration (VA) Medical Center in Palo Alto, California. Nineteen of the 27 subjects in Vietnam saw combat. Measuring incidents of assault and assault-related behavior during admission, the study made correlations to self-report of combat exposure and criminal behavior before and after military service. When examined independently as a risk for inpatient assaultive behavior, significant correlations were found between pre-service criminal behavior, combat experience, and post-service criminal behavior. Multiple regression analyses demonstrated that while pre-military antisocial behavior predicted post-military antisocial behavior, violent tendencies in Vietnam era veterans were better explained by their war experience than by premorbid criminal behavior. The study suggested that anger and violence was better viewed as "reaction stress rather than as simply another outburst of a notoriously sociopathic population."[4] The generalizability of these conclusions is limited because the sample size was small, all study participants had schizophrenia, and substance abuse was not controlled for in the analysis.

Resnick and colleagues[5] reviewed assessment data from 118 Vietnam era veterans seeking services at two Los Angeles VA hospitals to examine the relationships between the number of pre-adult and adult antisocial behaviors (as defined by the *Diagnostic and Statistical Manual of Mental Disorders*, Third Edition [*DSM-III*][6] criteria for antisocial personality disorder), level of combat exposure, and development of combat-related PTSD symptoms. The Structured Diagnostic Interview for Vietnam Veterans was used to obtain a thorough pre-military, military, and post-military history and to determine objective scores of pre-adult antisocial behavior, adult antisocial behavior, combat exposure, and PTSD symptom intensity.[7] Hierarchical regression analyses indicated that combat exposure was significantly associated with PTSD severity ($P<.005$), and that the number of adult antisocial behaviors was predicted by the number of pre-adult antisocial behaviors ($P<.05$) and by combat exposure ($P<.005$). No interaction effect was observed for the pre-adult behavior and combat exposure. Resnick and colleagues[5] concluded that the degree of combat exposure exerts independent effects on the development of PTSD symptoms as well as on post-combat antisocial behavior. The authors noted limitations based on data derived from retrospective interviews. Antisocial behavior scores were determined by behavior that included interpersonal violence, but this was only one of four determinants of overall score. Since other studies demonstrated an association between combat exposure and antisocial behavior, including non-violent arrests,[8,9] the extent to which this study demonstrates combat exposure as a predictor of violence is less clear. Finally, the fact that subjects were drawn from clinical populations limits the generalizability to non-clinical populations. In a sample of 114 Vietnam veterans, Wilson and Zigelbaum[10] noted a relationship between interpersonal assault, combat experience, and PTSD symptoms as well, but also failed to control for other variables associated with violent behavior.

PSTD AS A PREDICTOR OF POST-MILITARY VIOLENCE AND AGGRESSION

While the aformentioned studies examined combat exposure, violence, and antisocial behavior, they did not specifically explore the diagnosis of PTSD as a risk factor for these outcomes. Other studies of Vietnam veterans have examined this association in depth.

In the National Vietnam Veterans Readjustment Study (NVVRS), Kulka and colleagues[11] found that male Vietnam veterans with PTSD reported an average of 13.3 acts of violence in the preceding year, in contrast to 3.5 acts of violence reported by Vietnam veterans who did not receive a PTSD diagnosis. However, in the original sample, veterans with PTSD had been exposed to greater levels of combat and had higher levels of post-Vietnam substance abuse. These variables were associated with increased violence and were not controlled for in the analysis, thus confounding interpretation of the association between PTSD per se, and violent acts.

Lasko and colleagues[12] measured self-reported aggression using a number of previously validated instruments. Their sample included 27 male Vietnam veterans who met *DSM-III-R*[13] Structural Clinical Interview criteria for PTSD,[14] and 15 non-PTSD Vietnam veteran controls. Significant differences on nearly all psychometric measures of aggression were found with higher levels observed in the PTSD group. These differences were not explained by either level of combat exposure or history of substance abuse.

Mcfall and colleagues[15] compared male Vietnam veterans seeking inpatient treatment for PTSD (N=228), to male psychiatric inpatients without PTSD (N=64), and to a community sample of Vietnam veterans with PTSD not undergoing inpatient treatment for violent behavior (N=273). Violent behavior included property destruction, physical fighting, and threats with and without weapons. After controlling for warzone variables, patients seeking inpatient treatment for PTSD were significantly more likely than psychiatric inpatients without PTSD to have engaged in one or more violent acts in the 4 months preceding hospitalization ($P<.001$). The PTSD inpatient group was more likely to endorse physical fighting ($P<.01$), threats of violence without a weapon ($P<.01$), or threats of violence with a weapon ($P<.001$), than the community sample. However, the small number of subjects without PTSD in the community sample precluded drawing distinctions between those patients with PTSD compared to those without PTSD. When considered in conjunction with the findings of Lasko and colleagues,[12] the study provides supporting evidence of a relationship between PTSD and violent aggression independent of level of combat exposure. However, as in previously cited studies, the findings were essentially limited to males with combat-related PTSD.

Collins and Bailey[16] examined a sample of 1,327 incarcerated male felons in the North Carolina prison system. No patients in the study developed PTSD from combat-related experience. Information from the Diagnostic Interview Schedule, Version III, was added to specific questions about demographics and criminal history in individual interviews and through a comprehensive review of State Department of Corrections and Bureau of Investigations records on each participant. Presence or absence of PTSD was recorded, as well as the temporal relationship between first PTSD symptom and six indicators of violence. The indicators of violence included history of multiple fights since 18 years of age, current incarceration or former arrests for rape or assault, and current incarceration or lifetime arrest for robbery. Of 1,140 subjects who agreed to participate and on whom sufficient data was available for analysis, 2.3% satisfied *DSM-III* criteria for PTSD. After controlling for demographic factors, race, antisocial personality, and problem drinking, the authors found that those who received a diagnosis of PTSD were significantly more likely to be currently incarcerated for homicide, rape, or assault ($P<.001$), or to have an arrest history for a violent offense in the year before incarceration ($P<.001$). The authors noted that among subjects who reported at least one PTSD symptom and at least one arrest for homicide, rape, or assault, 85% reported that their first PTSD symptom occurred in the same year of, or in the previous year to, their arrest. Despite the limited number of subjects who met criteria for PTSD, the authors noted that the stability of model results and the level of statistical significance suggested that PTSD—even when antisocial personality disorder was controlled for and when symptoms were unrelated to combat experience—was associated with subsequent violence.

"PTSD—EVEN WHEN ANTISOCIAL PERSONALITY DISORDER WAS CONTROLLED FOR AND WHENSYMPTOMS WERE UNRELATED TO COMBAT EXPERIENCE—WAS ASSOCIATED WITH SUBSEQUENT VIOLENCE."

A number of studies have sought to define the relationship of pre-military experience to warzone abusive violence (eg, participation in atrocities) and to subsequent development of PTSD. Laufer and colleagues[17] examined data on 336 Vietnam combat veterans and found that combatants that participated in abusive violence or atrocities during the war were more likely to have enlisted rather than have been drafted, had higher rates of juvenile delinquency, and had dropped out of high school more frequently. In another

NVVRS study, Kulka and colleagues[18] examined childhood abuse, childhood problem behaviors, and antisocial personality before 18 years of age as potential predictors of later warzone violence. Self-report of pre-military difficulties were recorded on a Lichert scale and compared to six types of warzone abusive violence, which included torturing, wounding, or killing prisoners of war; terrorizing, wounding, or killing civilians; and mutilating of bodies. These types of violence were ultimately combined into a single magnitude variable. No significant correlations were found.

When Fontana and Rosenheck[19] re-examined the NVVRS data for a relationship between being a prior victim of sexual abuse and warzone violence, no correlation was found. However, sexual abuse criteria were defined very broadly as "physical assault, torture, rape, mugging, or similar assault (not war related)." This diminished any understanding of the potential contribution of each component in the study (eg, individuals with a history of being mugged but not raped may have endorsed this abuse item). However, a second study of outpatient Vietnam veterans using the same database more carefully discriminated between childhood physical and sexual abuse items.[19] When either was affirmed, frequency was measured on a Lichert scale. As in the first study, no correlations were found between abuse and violence in the warzone.

Finally, Hiley-Young and colleagues[20] examined data on 207 consecutively admitted Vietnam veterans and assessed pre-military, warzone, and post-military experience. Complete data were available on 177 participants. High rates of childhood victimization, warzone violence, and post-military violence were found in the PTSD sample, as measured by the Minnesota Multiphasic Personality Inventory for PTSD subscale scores.[21] Here, level of combat exposure predicted PTSD severity. Rates of childhood abuse were similar to those reported in previous epidemiologic studies of veterans with PTSD, but neither childhood abuse nor other childhood factors predicted warzone violence. Of the six measures of warzone abusive violence, only participation in mutilation was related to the development of PTSD ($P<.01$), and only participation in killing prisoners of war or civilians predicted post-military violence toward a spouse ($P<.05$) or others ($P<.001$). Participation in abusive violence did not predict post-military drug abuse, alcohol abuse, or criminality. The authors noted methodologic limitations due to the inadequacy of instruments available for measurement of PTSD, the use of single items to measure complex childhood variables, and ambiguities associated with subjective historical reports of violence related to enemy combatants versus civilians. Again, the fact that study subjects were all adult, male psychiatric inpatients with extensive combat exposure limits the generalizability to larger or mixed gender veteran populations.

Taken as a whole, these studies suggest that both pre-military antisocial behavior and, to some extent, combat exposure during wartime contribute to post-military antisocial behavior. The studies suggest that pre-military childhood experiences are not strong predictors of wartime abusive violence. However, small and selective samples, absence of control for substance abuse or previous antisocial behavior, and overly inclusive definitions of both causal factors and outcome measures limit both the generalizability of conclusions and the definitiveness with which they may be drawn.

WARZONE EXPERIENCE AND INTIMATE PARTNER VIOLENCE

More recently, several studies have looked specifically at the relationship between battlefield deployment and subsequent spousal aggression and violence. Using structural equation modeling, Orcutt and colleagues[22] examined the effects of warzone stressors and PTSD symptom severity on partner reports of male-perpetrated intimate partner violence in 376 Vietnam veteran couples. Investigators noted that perceived battlefield threat (not actual combat exposure), severity of PTSD symptoms, and a number of premilitary adverse experiences demonstrated direct relationships with subsequent intimate partner violence. Interestingly, after controlling for PTSD, a direct negative correlation between combat exposure and partner violence was demonstrated. This result suggested that battlefield exposures themselves may not contribute to interpersonal violence, absent the mediating effect of PTSD. However, certain warzone experiences (eg, participation in battlefield atrocities and killing) have been demonstrated to predict post-deployment spousal violence.[20,23] McCarroll and colleagues[24] compared deployed to non-deployed male soldiers and found that when age, race, and previous violence were controlled for, deployment to a non-combat environment did not predict domestic violence upon return home. As with the more general studies of post-deployment violence and antisocial behaviors, these studies suggest a considerable contribution of pre-military variables, direct effects of certain specific (but not all) warzone combat experiences, and an indirect contribution of these and other variables mediated through the development of PTSD.[25]

RELATIONSHIP BETWEEN WARZONE TRAUMA, PTSD, AND ANTISOCIAL BEHAVIOR

An analysis of the extensive literature demonstrating that adverse childhood experiences predict subsequent develop-

ment of PTSD (in military and civilian populations) and that these experiences correlate with a wide variety of antisocial and violent behavior is beyond the scope of this article. However, a recent examination of the potential mediating role that battlefield-specific PTSD (and not childhood experience) plays in the subsequent development of post-military antisocial behavior should be noted.

In an effort to examine the question of the etiology of post-military antisocial behavior through structural equation modeling, Fontana and Rosenheck[26] recently reanalyzed data from the NVVRS in a manner that addresses several of the methodologic limitations of previous studies. With this approach, the total effects can be partitioned into those that are direct or unmediated by another variable, and those that are indirect or mediated by one or more other variables. All causal interpretations to be made of data are specified in advance and evaluated as a set. Such modeling cannot alter limitations of the associational data, but can provide an indication of how well a set of causal propositions fits the empirical associations within the data.[27]

In this study,[26] a sample of 1,198 male Vietnam veterans were divided into two random subsamples of 599 patients each. The subsamples did not differ on demographics or on pre-determined causal variables, which included premilitary risk factors, traumatic exposure and disciplinary actions in the military, homecoming reception, PTSD and post-military substance abuse, and antisocial behavior. Each of the postulated causal variables was measured using summations of a variety of indicators within the NVVRS database. For example, substance abuse was derived from the Diagnostic Interview Schedule of alcohol abuse/dependence and drug abuse/dependence during the preceding 6 months, and homecoming reception was measured using the sum of three questions concerning the extent to which the American people made the veteran feel "at home again, respected . . . and proud," and two scales of family support developed for the study.

By ordering the five causal variables according to their historic occurrence, pathways leading to antisocial behavior were generated in the two subsamples using an initial model (omitting PTSD and substance abuse) and an expanded model (including PTSD and substance abuse with the other causal variables). Amount of variance in antisocial behavior accounted for in the initial and expanded models differed by only 1%, but in the expanded model 55% of the total effects were attributed to the causal variables, and 30% of the total effect was attributed to PTSD and substance abuse. Both warzone exposure and homecoming reception contributed significantly to the development of PTSD in the causal model analysis. The investigators concluded that post-military antisocial behavior represented manifestations of a lifetime history of antisocial behavior far more than it reflected the after-effect of warzone experience. However, warzone trauma and homecoming reception, which contributed to the development of PTSD, contributed significantly to the variance in antisocial behavior observed. The authors acknowledged the limitations of the retrospective nature of historic data and reporting bias, particularly as they may affect models based on temporal occurrence and symptom self-reports of symptom severity and frequency.[27] Although concerns related to overly inclusive definitions of variables are applicable here, the significant contribution of homecoming reception on the development of PTSD has also been replicated in other studies.[28-30] The explanation of a mediating role for PTSD on antisocial behavior was consistent with the findings of Orcutt and colleagues[22] in their study of PTSD and intimate partner violence.

CONCLUSION

Differences in the nature of deployment, combat, and warzone experiences of military service members currently deploying to Southwest Asia and eventually returning home may contribute to differences in the incidence and prevalence of PTSD and the course and progression of illness. Preliminary studies of the prevalence, severity, and natural history of PTSD in these veterans appear to support this observation.[3] One such study of soldiers engaged in heavy combat in Iraq suggests that the rate of severe intimate partner violence reported 1 year after homecoming is considerably higher than the baseline rate of such violence in the non-deployed military population.[31] As deployments and homecomings are ongoing, any analyses of the extent to which this generation of returning members of the armed forces engage in violent or otherwise antisocial behavior are now only preliminary. Anecdotal reports of interpersonal violence and substance abuse have garnered considerable media attention, but systemic analyses have been limited to comparisons of pre- and post-war rates of mood, anxiety disorders, suicide, and substance abuse. The extent to which the studies of post-deployment violence can be generalized to the current population of returning volunteer force veterans (including larger percentages of women, reservists, and national guardsman) is unclear. However, these studies suggest that, particularly in the population of veterans either actively seeking treatment or otherwise coming to clinical attention, antisocial behavior (including aggression, hostility, and interpersonal violence) will be an issue of concern. Interventions directed at identifying and treating individuals at risk should include treatment for PTSD. However, existing models of the relationship

between combat experience, PTSD, and post-deployment antisocial behavior suggest that successful identification and treatment of veterans with PTSD from their battlefield experiences will not effectively engage the larger veteran population for whom post-deployment violence or antisocial behavior may also be a difficulty. ***PP***

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Supported by an unrestricted educational grant from GlaxoSmithKline