

Published by:

The National Center for PTSD
VA Medical and Regional
Office Center (116D)
White River Junction
Vermont 05009 USA

☎ (802) 296-5132
FTS (700) 829-5132
FAX (802) 296-5135
FTS FAX (700) 829-5135
Email: ptsd@dartmouth.edu

Subscriptions are available
from the Superintendent of
Documents, P.O. Box 371954,
Pittsburgh, PA 15250-7954.

Editorial Director
Matthew J. Friedman, MD,
PhD
Scientific Editor
Paula P. Schnurr, PhD
Managing Editor
Fred Lerner, DLS
Production
Sharon Liebert, MLS
Graphics
Margaret J. Pearson
Circulation Manager
Jan Clark

In this issue:

- The Persian Gulf War: New Findings on Traumatic Exposure and Stress
- PILOTS Update

National Center Sites
Executive Division
White River Junction
VT 05009

Behavioral Science
Division
Boston MA 02130

Clinical Laboratory
and Education Division
Menlo Park CA 94304

Clinical Neurosciences
Division
West Haven CT 06516

Evaluation Division
West Haven CT 06516

Pacific Islands Division
Honolulu, HI 96813

Women's Health Sciences
Division
Boston MA 02130



The National Center for Post-Traumatic Stress Disorder PTSD RESEARCH QUARTERLY

VOLUME 7, NUMBER 1

ISSN 1050-1835

WINTER 1996

THE PERSIAN GULF WAR: NEW FINDINGS ON TRAUMATIC EXPOSURE AND STRESS

Jessica Wolfe, Ph.D.¹
National Center for PTSD and Boston VAMC
Tufts University School of Medicine
Susan P. Proctor, D.Sc.²
Boston VAMC
Boston University Schools of Medicine
and Public Health

The conclusion of the Persian Gulf War in 1991 spawned a variety of research on the effects of wartime exposure and outcome. Although initial research emphasized issues like domestic adjustment and coping, vocational disruption, and the emergence of stress symptomatology, investigations targeting PTSD as an outcome in veterans were relatively limited. Presently, five years after the war's end, research has broadened in several ways, focusing on topics as diverse as longitudinal psychological adjustment and postwar physical health. We reviewed the extant mental health literature on the Persian Gulf War from 1991-1995 and found that studies fit roughly into five categories: phenomenology and prevalence of PTSD and stress reactions; treatment methods; effects on families; impact on indigenous populations; and physical health.

Following the premise that the war would be brief, with limited troop engagement and few (non-Iraqi) casualties, much of the early Gulf War research focused on determining rates of PTSD to ascertain whether the war's impact on psychological adjustment differed from prior military conflicts (e.g., Vietnam). To date, the majority of authors studying the Persian Gulf War have concluded that PTSD rates among military personnel are generally lower than those from prior wars, with the possible exception of heavily exposed units (e.g., graves registration). Wolfe and colleagues (1993), for example, evaluated 3,000 Army personnel (comprising 64 units) deployed to the Persian Gulf and found that rates of PTSD within five days of return were modest, between 4-9%, using valid and reliable self-report measures. Female soldiers reported higher rates of PTSD symptoms than men, along with other psychological problems (e.g., depression, anxiety), findings that have been substantiated by some other studies (e.g., Perconte et al., 1993, but see Southwick et al., 1995; Sutker et al., 1995). Consistent with prior research, Wolfe et al. (1993) found a strong positive correlation between stressor intensity and adverse psychological outcomes.

Studying soldiers with less varied duties, Sutker

and colleagues (1994) assessed a small sample (n=24) involving a Reserve graves registration unit and found that nearly 50% of soldiers displayed symptoms of PTSD eight months after returning. Moreover, a PTSD diagnosis was strongly linked to problems with depression and substance abuse, supporting earlier research on comorbidity. Most importantly, body recovery and identification—two gruesome tasks—showed the strongest association with PTSD as an outcome, confirming that exposure to highly stressful event components is especially noxious. Sutker and colleagues (1994) confirmed the impact of deployment events in a subsequent article where the authors compared current and lifetime rates of war-related PTSD between members of the preceding unit and a comparable nondeployed Reserve unit (i.e., with the same military occupational specialty). Although demographic and premorbid psychological characteristics were generally comparable across the two groups, postwar outcomes differed significantly: 48% of the deployed unit met criteria for PTSD (lifetime prevalence of 65%) compared to 0% (lifetime prevalence of 0%) for the nondeployed unit.

Southwick et al. (1995) studied longitudinal consequences of Persian Gulf War service and found moderate levels of PTSD symptomatology in two National Guard units at one and six months. At one month post-return, only three individuals out of 84 met full criteria for PTSD; however, an additional four met PTSD criteria at six months, suggesting increases over time. Generally, symptoms of hyperarousal were the most severe. A two-year follow-up of 62 members of the original cohort revealed further increases in PTSD symptom levels, with hyperarousal still the most elevated. No participants who met PTSD criteria at either of the two preceding study points fell below case status at two years, suggesting the persistence of the symptom course for some individuals.

Perconte et al. (1993) also surveyed deployed and nondeployed American military personnel using

IMPORTANT MESSAGE FOR INDIVIDUAL VA SUBSCRIBERS Final Notice

If the code 99 appears on the mailing label on your copy of this issue, you need to renew your free subscription to the *Research Quarterly*. Please photocopy your mailing label and return it to us, making any necessary corrections.

¹Address for Dr. Wolfe: National Center for PTSD (116B-3), VA Medical Center, 150 South Huntington Ave., Boston, MA 02130. Internet: wolfe.jessica@boston.va.gov. ²Address for Dr. Proctor: Boston Environmental Hazards Center (116B-4), VA Medical Center, 150 South Huntington Ave., Boston, MA 02130. Internet: proctor.susan@boston.va.gov.

reliable psychometric measures and found that 15% of the deployed group—but only 4% of nondeployed soldiers—exceeded previously established cut-points for PTSD using instruments like the Mississippi Scale. This finding supports the potentially adverse impact of war-zone exposure but highlights that PTSD rates may vary widely, depending in part on the nature of exposure and the sample being studied. McCarroll and colleagues (1995) conducted important research comparing war-exposed versus nonexposed and occupationally experienced versus inexperienced American soldiers serving as mortuary workers during the Persian Gulf War. The authors found significantly higher PTSD rates among military personnel who were exposed (versus nonexposed) to dead bodies as well as for those without prior experience in this occupation. The latter contributed significantly to the adverse impact of exposure, as did nonvolunteer task status. Although psychological symptoms on average decreased over time, the course of those with initial symptoms tended to persist, suggesting that once a stress reaction is formed, it may be difficult to eliminate. This finding was especially pronounced for inexperienced workers. Finally, apart from PTSD symptoms, anxiety and general distress were associated with military deployment overall.

Another noteworthy risk factor relates to precombat abuse. Engel et al. (1993) found that precombat abuse led to higher rates of PTSD symptomatology in Persian Gulf personnel following deployment. This relationship was substantially modified by gender: deployed women with precombat abuse had significantly greater PTSD symptomatology than deployed females without these histories, suggesting a relationship between certain premilitary stress characteristics and effects of war.

The preceding studies suggest that PTSD prevalence among Persian Gulf military personnel varies markedly, ranging from 3-50%, with most studies on the lower end. This variation is likely to stem from several factors: differences in instrumentation; sample composition/unit task; timing of assessment; reporting/assessment formats; and choice of outcome domain. Still, several conclusions can be reached. First, even brief or circumscribed wartime deployment is associated with increases in general distress and PTSD symptomatology. Second, intensity of exposure is robustly correlated with psychological outcomes, although certain factors mediate its impact (e.g., prior combat or occupational preparedness), at least within military samples. Third, although the initiation of a stress reaction may depend on multiple individual characteristics (e.g., coping style), once initiated, PTSD symptomatology is frequently resistant to extinction, especially when the exposure has been intense or gruesome (a dose-response model) or considerable time has elapsed. Finally, there appears to be a "layering" of risk factors, whereby more inexperienced personnel and tasks involving nonvoluntary exposure are strongly associated with poorer outcomes, over and above the effects of event severity. These findings indicate a continuing need for multidimensional models of traumatic stress and adaptation.

Most research on treatment interventions emphasizes initial debriefing and preventive approaches. At the war's start, Hobfoll et al. (1991) recommended individual and group interventions that directly emphasized the anticipated impact of secondary war stress, family upheaval, and financial adversity. To evaluate the universality of post-trauma responding, Pennebaker and Harber (1993) compared reactions of survivors of the 1989 Loma Prieta Earthquake and Persian Gulf War personnel and found similar but distinct sequential stages of adaptation: initial openness and discussion of the event; pronounced inhibition but internal reminiscing (e.g., ruminations, nightmares); and longer-range adaptation. The authors found that talking about stressor experiences was widely beneficial, and needed to continue well beyond the acute stage. Ford et al. (1993) found that problems in postwar adjustment emerged over time (even one to two years), especially when family systems and social networks had been disrupted. Furthermore, in cases where the family had been impacted, the veteran's readjustment was likely to be similarly affected. Consequently, interventions targeting restoration of communication, developmental and life span issues, and family stabilization are essential.

Mirroring the lack of treatment outcome studies, there is little published research on the utility of pharmacotherapy for participants in the Persian Gulf War. Friedman and colleagues (1993) delineate important distinctions between acute stress reactions and actual PTSD and provide a range of treatment guidelines for each adjustment phase.

A somewhat larger body of literature has explored the traumatic effects of the Persian Gulf War on local populations. Particularly due to the expected traumatic stress of SCUD missile attacks, several researchers have explored the effects of anticipating or experiencing missile attacks. Other researchers have examined other aspects of war on local families and children. Bleich et al. (1992) reviewed the medical records of all patients hospitalized as a result of the 18 missile attacks in Israel and determined that 43% of the 773 casualties evacuated to hospitals were psychological casualties. Higher rates of stress reactions were observed at the beginning of the war, potentially due to the increased fear of chemical weaponry and the initial tendency of rescue teams to evacuate civilians to hospitals. It is possible that an observed decline in psychological casualties during the war represents a habituation effect, although empirical data are lacking. In contrast to other research, rates of psychological casualties in this study were not related to the presence of property damage or physical injuries.

Several studies have examined the effect of the Gulf War on the health and behavior of local children. Schwarzwald and colleagues (1994) conducted a one-year follow-up of Israeli school children and found that, overall, the rate for PTSD (scored dichotomously) dropped significantly from 22% to 12%. This counters research described above, which indicates that PTSD tends to persist over time. Younger children from those areas that were directly hit by SCUD missiles, compared to those from other locations, experienced substantially more long-lasting stress responses. Al-

Eissa (1995) surveyed 106 Kuwaiti children who had been displaced with their families by the war and were living in Riyadh, Saudi Arabia in October, 1990. Compared to 120 Saudi children of the same age (7-14 years), the Kuwaiti children showed poor concentration, distractibility, shouting, overdependency, and emotional lability.

Literature investigating family units suggests that separation for military families is capable of producing stress syndromes similar to PTSD. Rosen and colleagues (1994) have conducted several studies exploring the effects of coping, social support, and levels of emotional distress on separation stress reactions in American Persian Gulf veterans' families. In their 1994 study, the authors found that younger spouses of PGW veterans and those with a tendency to react to the deployment with high levels of emotional distress were more likely to utilize a disproportionate amount of support resources. However, several other factors appeared to play a role, including the soldier's rank, satisfaction with services, family support, and minority group status. Wexler and McGrath (1991) conducted a pilot study exploring the effects of war separation on 180 American Army wives and observed a similar risk for younger age (25-30 years) and minority status. These findings may require further study as there was no simultaneous adjustment for other background factors (e.g., number of children, education, socioeconomic status). In addition, response patterns varied by age: 35% of wives over 30 handled the stress by overeating while a majority of much younger women (17-20) were less able to eat in response to tension. Thus, developmental factors were apparent.

Some research has been conducted on the adverse effects of prior war exposure on response to the Persian Gulf War (e.g., female Vietnam veterans, Wolfe et al., 1992). However, there has been minimal analysis of outcome patterns of Vietnam veterans who served in the Persian Gulf theater. Little is known yet about possible additive or multiplicative effects of war trauma on traumatic stress.

Finally, physical health status and health perceptions are increasing areas of interest following military conflicts. For military personnel, only a few articles have been published that discuss rates and types of somatic symptoms following Persian Gulf deployment (NIH Technology Assessment Workshop Panel, 1994; Persian Gulf Veterans Coordinating Board, 1995). Furthermore, the characteristics underlying these symptoms remain unclear (i.e., whether they reflect somatization disorders, sequelae of PTSD, or medical illness derived from hazardous environmental exposures). Although PTSD has a demonstrated association with increased rates of health complaints, the consensus of most Persian Gulf research to date is that the physical health concerns of Gulf War veterans are insufficiently explained by an exclusive reliance on psychological mechanisms. Substantially more research can be expected.

Although much of the research on the Persian Gulf War supports earlier findings on the nature of stress disorders, new trends have emerged, for example, the impact of premilitary characteristics on outcomes, issues associated with gender status and gender role, developmental phe-

nomena, and the role of stress in physical health. Future empirical research can contribute greatly to these areas.

SELECTED ABSTRACTS

AL-EISSA, Y.A. (1995). **The impact of the Gulf armed conflict on the health and behaviour of Kuwaiti children.** *Social Science and Medicine*, 41, 1033-1037. This study deals with the psychological reactions of Kuwaiti children to war-related stresses in the early period of the Gulf crisis following the summer 1990 Iraqi invasion of Kuwait. A sample of 106 children was drawn from Kuwaiti displaced families and a comparable control sample was obtained from Saudi families in Riyadh, Saudi Arabia. An interview checklist of symptoms of physical and psychological distress was administered to the index child and a female key informant in each household of cases and controls. Most Kuwaiti children were exposed to unpleasant war experiences. It was found that Kuwaiti children exhibited a substantially greater degree of dysfunctional social and emotional behaviour. The types of adverse behaviours were a function of the child's age, sex and experience of aggression. The findings support the notion that a negative relationship exists between armed conflict and the health and behaviour of the children. The complex needs of children exposed to violence require professionals to seek ways of combining psychodynamic interventions and relief programmes.

BLEICH, A., DYCIAN, A., KOSLOWSKY, M., SOLOMON, Z., & WIENER, M. (1992). **Psychiatric implications of missile attacks on a civilian population: Israeli lessons from the Persian Gulf War.** *Journal of the American Medical Association*, 268, 613-615. Objective: To determine the proportion of hospitalized patients who had stress reactions as a result of missile attacks during the Persian Gulf War and evaluate the factors that influenced their evacuation. Design: Review of medical records of patients hospitalized as a result of missile attacks. Setting: During the Persian Gulf War in the winter of 1991, Israel received 18 missile attacks involving 39 surface-to-surface Scud missiles. The uncertainty in time, place, and type of warhead, conventional or chemical, was a source of chronic stress and the immediate cause for many traumatic stress reactions at or near the missile attack sites. Participants: Data from victims who were injured after each missile attack were available through a central hookup between 12 local hospitals and the Medical Corps of the Israeli Defence Force. Main Outcome Measure: The number of persons diagnosed in the hospital as psychological casualties after each missile attack. Results: Approximately 43 percent of the 773 casualties evacuated to hospitals were diagnosed as psychological casualties, and an additional 27 percent had mistakenly injected themselves with atropine. Data also indicated that triage of psychological casualties to hospitals was more a function of the rescue team's training and preparation than the severity or extent of injury or damage. Conclusions: Optimal treatment during events that cause mass casualties requires proper preparation of rescue teams as well as reorganization of the hospital's psychiatric services. The threat of chemical warfare affected the number and nature of stress reactions.

ENGEL, C.C., ENGEL, A.L., CAMPBELL, S.J., MCFALL, M.E., RUSSO, J., & KATON, W. (1993). **Posttraumatic stress disorder symptoms and precombat sexual and physical abuse in Desert Storm veterans.** *Journal of Nervous and Mental Disease*, 181, 683-688. The purpose of this research was to study the association

between precombat sexual and physical abuse and combat-related PTSD symptoms in a clinical sample of male and female Desert Storm veterans. 297 veterans provided data on precombat sexual and physical abuse, precombat psychiatric problems, sociodemographics, Desert Storm combat exposure, and PTSD symptomatology using the Mississippi Scale. Men reported significantly higher levels of combat exposure, and women described significantly more frequent precombat abuse. Precombat-abused veterans reported more frequent precombat psychiatric histories. Analysis of covariance revealed that gender significantly modified the impact of precombat abuse on combat-related and other PTSD symptomatology after adjusting for precombat psychiatric history and level of combat exposure. Specifically, females describing precombat abuse reported much greater PTSD symptomatology than did females denying precombat abuse. These results in conjunction with previous research suggest that a relationship between precombat abuse and combat-related PTSD may exist. Prospective, longitudinal studies of both men and women are needed.

FORD, J.D., SHAW, D., SENNHAUSER, S., GREAVES, D., THACKER, B., CHANDLER, P., SCHWARTZ, L., & MCCLAIN, V. (1993). **Psychosocial debriefing after Operation Desert Storm: Marital and family assessment and intervention.** *Journal of Social Issues*, 49, 73-102. This article provides an overview of and initial empirical findings from a preventive clinical/educational model for psychosocial assessment and intervention with the families of Operation Desert Storm (ODS) veterans. Interview and questionnaire data were obtained (a) 2-6 months after demobilization from ODS from veteran/veteran or veteran/civilian spouse couples who received conjoint time-limited therapy and veterans from the same Reserve and National Guard Units who received one-to-one time-limited therapy and (b) 12-15 months after demobilization from veterans deployed during ODS with the same military units. Principal findings are as follows: (1) the trauma and strain of war-zone military service, family separation, and subsequent family and community readjustment take a toll on a significant minority of ODS veterans and their families that is directly related to the stress symptomatology experienced by the veteran; and (2) with timely psychosocial intervention—based on life-span developmental and self-psychology, family systems theory, and a communitarian social integration model—veterans and families in distress are able to substantially resolve symptoms of psychosocial malfunctioning and even begin to accrue personal and systemic benefits from their ODS stressor experiences.

FRIEDMAN, M.J., SOUTHWICK, S.M., & CHARNEY, D.S. (1993). **Pharmacotherapy for recently evacuated military casualties.** *Military Medicine*, 158, 493-497. In late 1990 during the massive Operation Desert Shield/Storm (ODS) deployment of United Nations troops, the VA/DoD Joint Contingency Plan was activated. Worst case scenarios projected tens of thousands of medical evacuees from the Persian Gulf and predicted that U.S. Military Communication Zone and CONUS bed capacity would quickly be saturated. As a result, a massive educational program was rapidly implemented to prepare 80 VA hospitals to receive ODS personnel within 1-3 weeks of their evacuation from battalion aid stations or other front-echelon medical facilities. This article was written as part of this educational effort. Noting that there were no published articles on pharmacotherapy for recently evacuated military casualties, the authors wrote the present manuscript for inclusion in the ODS Clinical Packet prepared by the VA's National Center for PTSD and circulated to VA mental health professionals. Since the published literature still lacks an

article on this subject and since we believe that our comments on pharmacotherapy apply to survivors of most acute traumatic events, we present our observations and recommendations with the hope that they may be useful to military, VA, and civilian practitioners.

HOB FALL, S.E., SPIELBERGER, C.D., BREZNITZ, S., FIGLEY, C.R., FOLKMAN, S., GREEN, B.L., MEICHENBAUM, D., MILGRAM, N.A., SANDLER, I.N., SARASON, I.G., & VAN DER KOLK, B.A. (1991). **War-related stress: Addressing the stress of war and other traumatic events.** *American Psychologist*, 46, 848-855. A task force on war-related stress was convened to develop strategies for prevention and treatment of psychological, psychosocial, and psychosomatic disorders associated with the Persian Gulf War and other extreme stressors facing communities in general. The task force focused on the return home, reunion, and reintegration of service personnel with their families and work. Although the Persian Gulf War was won with relative ease, negative psychological sequelae may develop in some individuals because of the stress of war, family disruption, financial difficulty, and changes in family routines. Typical stress reactions and modes of coping that are usually unsuccessful or destructive were outlined, and suggestions were made for monitoring these. In addition, guidelines for successful coping were developed. Special attention was given to children's reactions and needs. Recommendations were made for outreach and intervention on the policy, systems (e.g., schools, businesses, governmental agencies), family, and individual levels.

MCCARROLL, J.E., URSANO, R.J., FULLERTON, C.S., & LUNDY, A. (1995). **Anticipatory stress of handling human remains from the Persian Gulf War: Predictors of intrusion and avoidance.** *Journal of Nervous and Mental Disease*, 183, 698-703. High levels of distress were found in military mortuary workers prior to the arrival of the human remains from the Persian Gulf War of 1991. To better understand the stress of anticipating the handling of remains, we performed stepwise multiple regression analyses to identify the best predictors of intrusive thoughts and avoidant thoughts and behavior, two of the primary symptoms of PTSD. After volunteer status and sex were controlled, fear and discomfort with mutilation and the grotesque, as measured by the Mutilation Questionnaire, and defensiveness or denial, as measured by the Marlowe-Crowne Scale, were significant predictors of intrusion and avoidance in the inexperienced group. In the experienced group, only the Mutilation Questionnaire predicted intrusion and avoidance. Results have implications for selection, training, and interventions for mortuary workers and other disaster workers whose job includes exposure to human remains.

NIH TECHNOLOGY ASSESSMENT WORKSHOP PANEL. (1994). **The Persian Gulf experience and health.** *Journal of the American Medical Association*, 272, 391-396. Reports on the chemical and biological agents that may be possible causes of unexpected illnesses in Persian Gulf War veterans, concluding that "it is possible that the expression of PTSD may be distinct in the Persian Gulf experience, and may take the form of somatic and multisystem symptoms rather than classic PTSD numbness and flashbacks." [Adapted from Text].

PENNEBAKER, J.W. & HARBER, K.D. (1993). **A social stage model of collective coping: The Loma Prieta Earthquake and the Persian Gulf War.** *Journal of Social Issues*, 49, 125-145. When individuals face an emotional upheaval, they naturally talk and think about it. If they are unable to talk with others but continue

to think about the event, they are at greater risk for a variety of psychological and health problems. Drawing on survey data gathered from San Francisco residents after the Loma Prieta Earthquake and from Dallas residents during and after the Persian Gulf War, we found evidence to support a social stage model of coping. Immediately after an upheaval, individuals openly talk and think about the event for approximately two weeks. Following this emergency stage, individuals progress into an inhibition stage wherein they stop talking about the upheaval but continue thinking about it for approximately six weeks. Certain indicators of distress, such as hostility and dreaming, peak during the inhibition phase. After this time, people enter an adaptation phase wherein they neither talk nor think about the upheaval. Implications for theory and interventions for both broad-scale collective upheavals as well as personal traumas are discussed.

PERCONTE, S., WILSON, A., PONTIUS, E., DIETRICK, A., KIRSCH, C., & SPARACINO, C. (1993). **Unit-based intervention for Gulf War soldiers surviving a SCUD missile attack: Program description and preliminary findings.** *Journal of Traumatic Stress, 6*, 225-238. An intensive, on-site treatment intervention was designed and implemented for the nonhospitalized survivors of a SCUD missile attack during the Persian Gulf War, following their return to the states. 28 members of the 14th Quartermasters Unit, 24 males and 4 females, were evaluated and administered the Mississippi Scale for Combat-Related PTSD (revised), the Beck Depression Inventory, and the SCL-90R to assess levels of war stress symptomatology. A total of 20 soldiers participated in the treatment program, which consisted of a highly structured intervention utilizing a multimodal treatment approach. The pre- and post-treatment testing suggested relatively high levels of symptomatology related to war stress in the soldiers who were in the vicinity of the missile blast, which decreased significantly following treatment. While the overall treatment effort was well-received, several obstacles were encountered and discussed.

PERSIAN GULF VETERANS COORDINATING BOARD. (1995). **Unexplained illnesses among Desert Storm veterans: A search for causes, treatment, and cooperation.** *Archives of Internal Medicine, 155*, 262-268. Between August 1990 and March 1991, the United States deployed 697,000 troops to the Persian Gulf to liberate Kuwait from Iraqi occupation. Since the Gulf War, most veterans seeking medical care at Departments of Veterans Affairs and Defense medical facilities have had diagnosable conditions, but the symptoms of several thousand veterans have not been readily explained. The most commonly reported, unexplained complaints have been chronic fatigue, rash, headache, arthralgias/myalgias, difficulty concentrating, forgetfulness, and irritability. These symptoms have not been localized to any one organ system, and there has been no consistent physical sign or laboratory abnormality that indicates a single specific disease. Because of the unexplained illnesses being experienced by some Gulf War troops, a comprehensive clinical and research effort has been organized by the Departments of Veterans Affairs, Defense, and Health and Human Services to provide care for veterans and to evaluate their medical problems. To determine the causes and most effective treatments of illnesses among Gulf War veterans, a thorough understanding of all potential health risks associated with service in the Persian Gulf is necessary. These risks are reviewed in this article and include possible reactions to prophylactic drugs and vaccines, infectious diseases, and exposures to chemicals, radiation, and smoke from oil fires.

ROSEN, L.N., WESTHUIS, D.J., & TEITELBAUM, J.M. (1994). **Patterns of adaptation among Army wives during Operations Desert Shield and Desert Storm.** *Military Medicine, 159*, 43-47. During the Operation Desert Shield/Storm (ODS) deployment, there was a perception among volunteers and professionals providing services and support to families that while most spouses were able to handle the stress, some younger spouses coped poorly. A cluster analysis using data from a mailed survey conducted during ODS confirmed that there were groups of younger spouses experiencing high levels of emotional distress. In addition, the study found that there was a group of older spouses with similar problems. Sociodemographic characteristics such as ethnic group and employment status, expectations of the Army, and unsatisfactory use of services discriminated among clusters. Groups with high levels of distress also had the highest levels of unsatisfactory use of services and the highest expectations of the Army.

SCHWARZWALD, J., WEISENBERG, M., SOLOMON, Z., & WAYSMAN, M. (1994). **Stress reactions of school-age children to the bombardment by Scud missiles: A 1-year follow-up.** *Journal of Traumatic Stress, 7*, 657-667. Follow-up long-term stress effects to bombardment by Scud missiles were restudied 1 year following the Persian Gulf war in a group of 326 6th, 8th, and 11th grade children from areas hit and not hit by the missiles. Postwar stress reactions were assessed by a continuous global symptom score and by a dichotomous PTSD index. Overall, a large drop in stress reactions was obtained with lapse of time. Residual long-term stress reactions were found to be associated with higher immediate (4-week) stress reactions, a greater degree of exposure, and younger age. Results were discussed in relation to residual and evaporation of stress reaction effects as well as in terms of childhood resilience.

SOUTHWICK, S.M., MORGAN, C.A., DARNELL, A., BREMNER, J.D., NICOLAOU, A.L., NAGY, L.M., & CHARNEY, D.S. (1995). **Trauma-related symptoms in veterans of Operation Desert Storm: A 2-year follow-up.** *American Journal of Psychiatry, 152*, 1150-1155. Objective: This study was a 2-year follow-up in an ongoing prospective examination of development of trauma-related symptoms over time in a community group of veterans of Operation Desert Storm. Method: 62 National Guard reservists, from one medical and one military police unit, completed the Mississippi Scale for Combat-Related PTSD and a DSM-III-R-based PTSD symptom scale 1 month, 6 months, and 2 years after returning from the Middle East. Differences in symptom severity over time were analyzed by using repeated measure analyses of variance. Results: Scores on the Mississippi scale, but not the DSM-III-R PTSD scale, increased significantly over time. Symptoms of hyperarousal were more severe at all time points than were symptoms of reexperiencing or avoidance. Level of combat exposure, as reflected by the Desert Storm trauma questionnaire, was significantly associated with the score on the Mississippi scale at 2 years but not at 1 month or 6 months. All subjects who met the Mississippi scale's diagnostic criteria for PTSD at 1 or 6 months still met the criteria at 2 years. Conclusions: Although symptoms were relatively mild, there was an overall increase in PTSD symptoms over 2 years. The statistical relationship between level of combat exposure and PTSD symptoms at 2 years, and not before, suggests that it may take time for the consequences of traumatic exposure to become apparent. Moreover, degree of exposure may be important in predicting the eventual development of symptoms. Continued follow-up will address the evolution of PTSD symptoms in Gulf War veterans.

SUTKER, P.B., DAVIS, J.M., UDDO, M., & DITTA, S.R. (1995). **Assessment of psychological distress in Persian Gulf troops: Ethnicity and gender comparisons.** *Journal of Personality Assessment*, 64, 415-427. This study reports results of psychological assessment among military participants in Operation Desert Storm, a more diverse ethnic and gender mix of American troops than has been mobilized for previous military operations. Symptoms of current psychological distress, including negative mood states, somatic complaints, and PTSD, in addition to personal and trauma characteristics, were measured in 653 Persian Gulf war-zone-exposed and 259 stateside-duty troops to test the hypothesis that ethnic minority status and female gender are associated with greater levels of psychological distress following war-zone duty. Findings point to potentially negative sequelae to war-zone stress in a portion of troops and suggest that ethnic minorities, but not necessarily women, may be more vulnerable to psychological risk.

SUTKER, P.B., UDDO, M., BRAILEY, K., ALLAIN, A.N., & ERRERA, P. (1994). **Psychological symptoms and psychiatric diagnoses in Operation Desert Storm troops serving graves registration duty.** *Journal of Traumatic Stress*, 7, 159-171. This clinical report describes symptoms of psychological and physical distress and psychiatric disorder in 24 Army Reservists who served war zone graves registration duty in support of Operation Desert Storm. Troops underwent comprehensive assessment for evidence of psychopathology that might be associated with war zone duty as one component of a debriefing protocol scheduled during regular drill exercises eight months after their return to the United States. Troops endorsed items suggestive of high war zone stress exposure, common symptoms of anxiety, anger, and depression, and multiple health and somatic concerns. Almost half of the sample met criteria for PTSD, and diagnosis of this disorder was strongly associated with evidence of depressive and substance abuse disorders. The gruesome aspects of body recovery and identification in a war zone setting were cited as stressor elements of significant negative impact.

SUTKER, P.B., UDDO, M., BRAILEY, K., VASTERLING, J.J., & ERRERA, P. (1994). **Psychopathology in war-zone deployed and nondeployed Operation Desert Storm troops assigned graves registration duties.** *Journal of Abnormal Psychology*, 103, 383-390. Early psychopathology outcomes were compared in troops mobilized for Persian Gulf graves registration duty but differentiated by war-zone deployment. Constructs of interest were Axis I psychiatric disorders, particularly PTSD, negative affect states, and somatic complaints. Psychometric instruments, including the Structured Clinical Interview for DSM-III-R, were administered to troops attending drill exercises. Although similar in personal characteristics and reporting low rates of premorbid psychopathology, groups differed in the prevalence of PTSD diagnoses, anxiety and anger symptoms, and somatic complaints. Current and lifetime PTSD rates of 48 percent and 65 percent, respectively, suggest that the psychological aftermath of war-zone participation involving the gruesome task of handling human remains was profound.

WEXLER, H.K. & MCGRATH, E. (1991). **Family member stress reactions to military involvement separation.** *Psychotherapy*, 28, 515-519. This article describes an exploratory study of stress reactions experienced by adult dependents separated from family members involved in the Persian Gulf War. The majority of respondents reported loneliness and anxiety along with strong feelings of pride and patriotism. Most of the sample reported a strong need for additional support groups. Separation reactions

were related to age, ethnicity, education, expected and actual lengths of the current separation, and number and duration of prior military separations.

WOLFE, J., BROWN, P.J., & KELLEY, J.M. (1993). **Reassessing war stress: Exposure and the Persian Gulf War.** *Journal of Social Issues*, 49, 15-31. Research has shown a clear association between war-zone exposure and psychological readjustment in soldiers. Newer findings suggest that certain event and person characteristics are especially influential in this process. The present article has the following goals: (a) to review existing parameters in the traditional measurement of war-zone exposure, (b) to consider conceptual and methodological limitations in these approaches, (c) to present empirical data from a cohort of Persian Gulf War veterans that support the utility of a broader conceptualization of war trauma, and (d) to examine how gender may be differentially associated with some dimensions of war-zone stress and psychological outcome following deployment. Data from the Fort Devens (MA) Operation Desert Storm Reunion Survey suggest that identifying diverse dimensions of war-zone stress may enhance efforts to understand veterans' initial and long-range wartime recovery.

WOLFE, J., BROWN, P.J., & BUCSELA, M.L. (1992). **Symptom responses of female Vietnam veterans to Operation Desert Storm.** *American Journal of Psychiatry*, 149, 676-679. Abstracted in *PTSD Research Quarterly*, 4(1), 1993.

ADDITIONAL CITATIONS Annotated by the Editors

AHMAD, A. (1992). **Symptoms of posttraumatic stress disorder among displaced Kurdish children in Iraq—victims of a man-made disaster after the Gulf war.** *Nordisk Psykiatrisk Tidsskrift/Nordic Journal of Psychiatry*, 46, 315-319. Assessed PTSD among 20 Kurdish children aged 6-16 years at 2 and 4 months after evacuation from Northern Iraq. All children had PTSD symptoms. Four met PTSD diagnostic criteria at 2 months and none met criteria at 4 months.

COTTON, P. (1992). **Gulf War symptoms remain puzzling.** *Journal of the American Medical Association*, 268, 2619. Briefly summarizes the possible etiologies of health problems faced by Gulf War veterans and describes various efforts being undertaken by VA and the Department of Defense to investigate these problems.

FRIEDMAN, M.J. (1994). **Neurobiological sensitization models of post-traumatic stress disorder: their possible relevance to multiple chemical sensitivity syndrome.** *Toxicology and Industrial Health*, 10, 449-462. Discusses the applicability of sensitization models to the phenomenology of PTSD and reviews the hypothesis that PTSD patients might have increased vulnerability to Multiple Chemical Sensitivity. The author provides information about three sensitization phenomena.

HINES, J.F. (1993). **A comparison of clinical diagnoses among male and female soldiers deployed during the Persian Gulf war.** *Military Medicine*, 158, 99-101. Compared male and female soldiers in terms of the types of medical visits made during Operation Desert Storm. Of the 10,332 visits made in 7 diagnostic categories, women made 6%

and men made 94%, which was proportional to the number of men and women in the Division under study. Women were more likely to be diagnosed with psychiatric and optometric disorders, whereas men were more likely to be diagnosed with orthopedic and dermatologic disorders.

MCCARROLL, J.E., URSANO, R.J., & FULLERTON, C.S. (1993). **Symptoms of posttraumatic stress disorder following recovery of war dead.** *American Journal of Psychiatry*, 150, 1875-1877. Examined symptoms of PTSD among military personnel who did (n = 116) and who did not (n = 118) handle human remains during Operation Desert Storm. Handling was associated with increased intrusive and avoidant symptoms. Individuals who were inexperienced at handling remains had more symptoms than those who were experienced.

MCCARROLL, J.E., URSANO, R.J., & FULLERTON, C.S. (1995). **Symptoms of PTSD following recovery of war dead: 13-15-month follow-up.** *American Journal of Psychiatry*, 152, 939-941. Conducted a 13-15 month follow-up of a sample of Desert Storm body handlers and controls who were originally studied by the authors 3-5 months after returning from war (McCarroll, Ursano, & Fullerton, 1993). PTSD symptoms declined in both groups, but individuals who had handled remains had elevated symptoms of PTSD at follow-up, relative to controls.

MCCARROLL, J.E., URSANO, R.J., FULLERTON, C.S., & LUNDY, A. (1993). **Traumatic stress of a wartime mortuary: Anticipation of exposure to mass death.** *Journal of Nervous and Mental Disease*, 181, 545-551.

Studied the effects of anticipation of exposure to traumatic death among workers in the Operation Desert Storm mortuary by comparing 386 workers who would be handling human remains with 87 support workers. Factors associated with increased pre-exposure distress were (anticipated) body handling assignment, nonvolunteer status, female sex, and inexperience.

ROSEN, L.N., TEITELBAUM, J.M., & WESTHUIS, D.J. (1993). **Children's reactions to the Desert Storm deployment: Initial findings from a survey of Army families.** *Military Medicine*, 158, 465-469.

Assessed psychological symptoms among 1,601 children of soldiers who were deployed during Operation Desert Storm. Questionnaire responses from the deployed soldiers' spouses (99% of whom were wives) indicated that children's symptoms were associated with parents' symptoms, siblings' symptoms, age, gender, and prior history of mental health, behavioral, or learning problems.

ROSEN, L.N., TEITELBAUM, J.M., & WESTHUIS, D.J. (1993). **Stressors, stress mediators, and emotional well-being among spouses of soldiers deployed to the Persian Gulf during Operation Desert Shield/Storm.** *Journal of Applied Social Psychology*, 23, 1587-1593.

Administered a questionnaire to spouses of soldiers who were deployed during the Persian Gulf War. Analyses focus on 981 wives who had not moved away from military installations during deployment. Emotional stressors of the deployment predicted the greatest amount of variance in symptoms and deployment-related events explained almost half of the variance in emotional stressors.

SOLOMON, Z., LAOR, N., WEILER, D., MULLER, U.F., HADAR, O., WAYSMAN, M., KOSLOWSKY, M., BENYAKAR, M., & BLEICH, A. (1993). **The psychological impact of the**

Gulf War: A study of acute stress in Israeli evacuees. *Archives of General Psychiatry*, 50, 320-321.

Studied psychological symptoms among 120 Israeli civilians during the Persian Gulf War. Eighty percent met symptom criteria for PTSD, although formal diagnosis was not possible because subjects were studied within 1 month after traumatic exposure. General psychiatric symptoms were explained primarily by background variables, whereas intrusive symptoms were explained primarily by stressor exposure. Neither background, exposure, nor post-exposure variables predicted avoidance symptoms.

SOUTHWICK, S.M., MORGAN, C.A., NAGY, L.M., BREMNER, J.D., NICOLAOU, A.L., JOHNSON, D.R., ROSENHECK, R., & CHARNEY, D.S. (1993). **Trauma-related symptoms in veterans of Operation Desert Storm: A preliminary report.** *American Journal of Psychiatry*, 150, 1524-1528.

Examined PTSD among 84 Persian Gulf veterans 1 month and 6 months following their return from the Gulf. Scores on the Mississippi scale, but not on a DSM-III-R-based symptom scale, increased over time. At both time points, symptoms of hyperarousal were more common than symptoms of either intrusion or avoidance.

SUTKER, P.B., DAVIS, J.M., UDDO, M., & DITTA, S.R. (1995). **War zone stress, personal resources, and PTSD in Persian Gulf War returnees.** *Journal of Abnormal Psychology*, 104, 444-452.

Used discriminant analysis to study relationships between personal and environmental resources and psychological outcomes among Persian Gulf veterans, 97 of whom had PTSD and 484 of whom had no psychiatric diagnosis. The commitment factor of hardiness, avoidance coping, and perceived family cohesion were the best predictors of a PTSD diagnosis.

WEIZMAN, R., LAOR, N., BARBER, Y., SELMAN, A., SCHUJOVIZKY, A., WOLMER, L., LARON, Z., & GIL-AD, I. (1994). **Impact of the Gulf War on the anxiety, cortisol, and growth hormone levels of Israeli civilians.** *American Journal of Psychiatry*, 151, 71-75.

Conducted two studies of Israeli civilians during the Persian Gulf War to assess changes in anxiety, cortisol, and growth hormone levels. Anxiety levels increased during the war and then returned to prewar levels after the war, but there were no changes observed in either cortisol or growth hormone over time.

PILOTS UPDATE

Since opening our World Wide Web site last November, we have added many pages to make it more useful to traumatic stress researchers and clinicians. If you point your Web browser at:

<http://www.dartmouth.edu/dms/ptsd/>

you will be connected to our Home Page. Or you may reach our Home Page from elsewhere on the Web. (There are now many Web sites that offer a link to the National Center's Home Page.)

Once you are there, you will find a brief description of the National Center and its activities, with a list of our seven divisions. Click on one of them and you will see a short description of that site's activities and instructions for

contacting the division by streetmail, telephone, fax, or electronic mail. As we receive the information from each division, we are adding a staff directory for each site, with individual telephone extensions and email addresses. If your Web browser allows, you can open a direct email link to selected personnel.

Our Home Page also contains a brief description of the PILOTS database, and provides access to a wide range of information for database users. You may download the entire *PILOTS Database User's Guide* in either PostScript or ASCII form. The former version contains the codes that will instruct your PostScript printer to duplicate exactly the appearance of the printed *User's Guide*. The latter is a text-only version that can be reproduced on simpler printers not equipped with PostScript capability.

These are both large files. If you have a slow modem or a noisy line, you might find them cumbersome to download in their entirety. Fortunately, our Web site provides an alternative. A substantial portion of the *PILOTS Database User's Guide* is now available for on-screen reading, divided into convenient modules with links from one section to another. These are listed on the Table of Contents page, so it is easy to find just the section that contains the information you need. The hierarchical tables for the PILOTS Thesaurus are included in our Web pages, and we hope to add the alphabetical index in the near future.

If you are eager to get started searching the PILOTS database, you can find brief access and search instructions just a click away from our Home Page. Another click will set up a direct telnet link to the Dartmouth College Library Online System—provided that your Web browser software includes telnet capability. (Some popular Internet providers do not include telnet among their features, but programs to add this capability are often available.)

Readers of our *PTSD Research Quarterly* can download both current and back issues via our Web site. We are planning several enhancements to this service, including individual articles formatted for on-screen reading, and author and subject indexes. We also hope to offer our sister publication, the *NCP Clinical Quarterly*, on our Web site.

As soon as our annual report for fiscal year 1995 is completed, we shall make it available on our Web site for downloading. The executive summary will also be available for on-screen reading. For those with an interest in joining the National Center staff, we will include notices of positions available in the various divisions as vacancies occur.

One of the most frequent requests that we receive is for general information on post-traumatic stress disorder: what it is, what treatment facilities are available within the Department of Veterans Affairs, and where to turn for further information. We are addressing this need by producing on-screen versions of several documents that we have been distributing in printed form, and by creating new documents specifically for our Web page. These include an updated version of Matthew Friedman's article on PTSD from the *Encyclopedia of Psychology*; a list of books recommended for non-professional readers; and a brief introduction to PTSD for veterans and their families.

Our Home Page concludes with links to other Web sites. We have chosen to keep these to a minimum. Many Web sites contain little or no original content, and merely offer links to other sites which themselves may have little information content of their own. Our goal is to make our Web site a repository of valuable information on PTSD, and leave to others the role of providing links to trauma- and mental-health-related sites elsewhere on the Web. There are several established Web sites that have been doing a splendid job of this. We are providing links only to a selected handful of these and relying on them to take users to their final destinations on the Net.

By limiting the contents of our Web site to material produced at the National Center for PTSD, we shall be able to ensure that the information it offers is as correct, complete, and authoritative as is humanly possible. Producing and maintaining this information will take up all of the resources that we can devote to the World Wide Web. We hope that our investment of time and effort will improve the flow of useful information to the traumatic stress community worldwide.

National Center for PTSD (116D)
VA Medical and Regional Office Center
White River Junction, Vermont 05009