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COMBAT EXPOSURE AND PTSD

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In this paper the author reviews the most instructive literature in the area of psychological consequences of combat exposure. The selected abstracts and citations serve as a broad, rather than comprehensive, survey of the diverse literature in this area. Unfortunately, not all of the fine work that has been reported can be presented in this brief report. By necessity, more-recent literature has been selected because it pertains specifically to posttraumatic stress disorder (PTSD), and that disorder has become central to our understanding of combat responses. Readers should not conclude from this decision that sequelae from combat exposure always fall neatly within the PTSD framework. The picture is much more complex.

Jones et al. (2002) recently reviewed the records of service members who participated in combat to determine the presence and nature of postcombat syndromes in British soldiers from the Boer War through the Persian Gulf War (PGW). They concluded that postwar syndromes have been universally present in all modern wars, but the nature of those syndromes has varied depending upon theories in medical science, the nature of combat, and sociological factors. Engel (2004) further described how social factors largely define the context in which postwar syndromes are experienced and understood in terms of their recognized phenomenology and also in terms of acknowledged causative factors and accepted therapeutic factors. In a retrospective review of historical military medical records, Jones et al. (2003) argued that PTSD may be more a modern culture-bound expression of trauma response than a timeless and universal human phenomenon. The reader must remain aware of his or her own biases and assumptions.

Interest in combat stress reactions originally derived from concern about their negative impact on military unit strength and functioning. During World War I, evacuation of soldiers suffering from combat stress reactions resulted in such substantial losses of combatants that treatment policy was modified. The principles of "forward psychiatry" were implemented. In practice, this treatment is summarized using the acronym PIE, which stands for proximity (treatment close to the battlefield), immediacy (rapid and readily available intervention), and ex-

pectancy (belief that the soldier would return to combat). Soldiers treated in this fashion were not only reported able to return to combat, but they also were presumed to develop fewer long-term psychiatric sequelae. For a comprehensive review of this subject, the reader is referred to the volume, *War Psychiatry* (Jones et al., 1995).

These principles continue to inform modern military psychiatry practice. PIE is a social-psychiatry model, with greater emphasis placed on supporting the soldier in his combat role than on identifying pathology. Battlefield symptoms are viewed as normal responses to abnormal circumstances, and terms such as "combat exhaustion" are used to better frame the condition as a non-clinical one. To make a soldier "a patient" is considered more likely to contribute to longer-term chronic psychiatric disability. Solomon and Benbenishty (1986) reported some of the strongest evidence of the effectiveness of forward treatment (particularly expectancy) on combat stress casualties in the 1982 Lebanon War. After one year, only 38% of soldiers who were returned to their units developed PTSD, compared to 74% who were evacuated out of theatre. However, this study was uncontrolled and results were likely affected by selection bias. In a thoughtful review of the military practice of "forward psychiatry," Jones and Wessely (2003) provided a concise history of the principles of PIE and concluded that reported outcomes may overstate PIE's effectiveness in returning soldiers to combat. As controlled studies in the combat environment are impractical, a thorough scientific examination of the value of PIE remains elusive.

Attention is now turned to the scientific study of clinical syndromes resulting from combat exposure. Interest in postcombat clinical syndromes is relatively recent and resulted largely from the recognition of postwar emotional problems in Vietnam veterans. Before discussing specific studies related to past wars, some general considerations about this literature must be addressed. First and foremost, the results of these studies must be viewed with an appreciation for the individual nature of the particular war that was studied, the intensity and character of the combat experience (e.g. deployment to a combat area versus actual combat participation), and the social context to which veterans returned.

Another significant consideration is whether data were collected prospectively or retrospectively. Studies of World War II and Vietnam were almost

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entirely retrospective in nature, a clear limitation. Often, participants rated their level of combat exposure many years, and sometimes decades, after the actual event. Retrospective accounts of combat exposure may be unreliable. In reexamination of the stability of recall of military exposures in PGW and Bosnia veterans, Wessely et al. (2003) reported the potential impact of instability of recall and the potential for either exaggeration or minimization of exposure impact.

An additional important consideration in reviewing this literature is that most studies used symptom measurement instruments. Established cutoff scores were typically used to determine which elements of the given study population met screening criteria for a disorder. Although these measurements likely are predictive of pathology, they are not equivalent to the individual diagnostic assessment required to establish the presence of a psychiatric condition. As a result, these studies might either under- or over-report PTSD prevalence.

As with all scientific literature, the reader should be mindful of other parameters as well. Research design, timing of measurement in relation to combat exposure, study populations employed (clinical versus non-clinical), and the use of a control group vary between studies. Surveying strategies (self-report via telephone survey or mailed survey versus structured interview) also differ between studies, as do measures. Even in studies using the same instrument, cutoff scores sometimes vary. Sample bias may also be present due to lower response rates in several studies (particularly in control populations) and study group attrition in some longitudinal studies. The literature of specific war studies should be scrutinized with these points in mind.

Few studies of World War II (WW II) and Korean veterans are available. Spiro et al (1994) described findings from the Normative Aging Study of a non-clinical sample of 1210 WW II and Korean War veteran participants. Measurements taken decades after these wars identified the continuing impact of combat exposure on the sustainment of PTSD symptoms in this group of aging veterans. While some variation in symptom level was reported between two measurement instruments used in the study, the prevalence of PTSD in this healthy sample of combat WW II veterans was relatively low, 1.15 percent. Those WW II veterans who had been exposed to moderate or heavy combat were at 13.3-fold greater risk for PTSD symptoms than non-combat-exposed contemporaries.

Numerous retrospective studies have looked at PTSD in the Vietnam veteran population, the most informative by scientists participating in the National Vietnam Veterans Readjustment Study. In one paper, Schlenger and colleagues from this group (Schlenger et al., 1992) reported the PTSD subset of findings from this large study. A carefully planned and executed methodology differentiated levels of PTSD between men and women and found the highest current prevalence of PTSD in those servicemen and women who served in theater (15.2% and 8.5%, respectively) when compared to veterans who did not

serve in theater (2.5% and 1.1%) or civilians (1.2% and 0.3%). Higher war-zone stress exposure resulted in increased prevalence of PTSD. The study also highlighted the differences in prevalence rates among different ethnic groups, with higher rates in minority populations.

The Israeli 1982 Lebanon War marked the beginning of routinely conducted prospective and longitudinal studies of combat-exposed service members. Solomon's (1987) two-year prospective study reported a PTSD prevalence of 56% in those soldiers who had been treated for combat stress reactions during the Lebanon War compared to 17% of a control group of similarly exposed combat soldiers who suffered no reported combat stress reaction. Although both groups demonstrated high levels of PTSD, the study group evidenced significantly higher levels of PTSD, suggesting a link between the presence of combat stress reactions and the future development of PTSD. Solomon's group contributed a series of important longitudinal studies of PTSD in Lebanon War Israeli service members.

By far, the greatest volume of literature examining the impact of combat on the development of PTSD has been generated from the study of PGW veterans. For a comprehensive review of the impact of this war on veterans, families, and communities, the reader is referred to Ursano and Norwood's (1996) volume on this topic. This work was often conducted in close proximity to the combat exposure and, in some cases, it tracked these soldiers over time. An excellent systematic review of this literature and meta-analysis conducted by Stimpson et al. (2003) again reported increased prevalence of PTSD and other mental disorders in service members who served in theatre compared to controls.

Earlier PGW studies typically reported on smaller populations. Sutker et al. (1993) compared PTSD symptom levels of 215 activated and deployed Army National Guard and reserve service members with 60 activated but non-deployed service members from the same units, dividing the deployed into high- and low-stress subgroups. Measurements were taken within 4 to 10 months of homecoming. Nineteen percent of war-zone-deployed met criteria for PTSD, 36% within the high-stress group and 5% within the low-stress group. Perconte et al. (1993) examined PTSD symptoms in a population of deployed reservists compared to non-deployed controls. More than 15% of the combat-deployed exceeded cutoff criteria for PTSD, compared to 4% of the control group. The authors demonstrated a consistent and clear association between level of stress and PTSD pathology. Southwick et al. (1993, 1995) studied 84 National Guard and reserve members at 1, 6, and 24 months after returning home and found progressive increases in PTSD symptoms, suggesting that clinical cases of PTSD may be delayed in their presentation. Of importance, those cases that screened positive at one month continued to screen positive for PTSD at 2 years.

Several studies have examined the impact of the PGW on very large populations of deployed service members. Stretch et al. (1996) reported on the congressionally mandated study of 1524 deployed active-duty, reserve, and

National Guard personnel versus 2727 non-deployed personnel approximately 18 months to 2 years after the war. They found no significant difference between service groups in the prevalence of PTSD but noted significant differences between those who deployed and those who did not (8.0% vs 1.3% in the active-duty population, and 9.2% vs. 2.1% in the reserve population). Those stressors that were most highly correlated with PTSD were related to combat exposure, as compared to stressors related more generically to deployment.

The Iowa Persian Gulf Study Group (1997) examined over 3000 service members for the presence of depression, PTSD, chronic fatigue, and cognitive dysfunction, as well as other medical and behavioral syndromes 5 years after the war. PTSD prevalence was lower than that reported in other studies, but still remained significant between groups. Approximately 2.0% of active-duty and reserve PGW deployed service members, as compared to 0.7% active-duty and 1.1% reserve non-deployed service members screened positive for PTSD. Deployed service members, were also more likely than others to endorse symptoms of two or more other medical or psychiatric conditions, demonstrating a high level of co-morbidity. Follow-up studies demonstrated relations between depression and PTSD (Black et al., 2004) and between PTSD and medical complaints (Barrett et al., 2002).

Wolfe and colleagues (1999) assessed over 2900 active-duty, reserve, and National Guard Army personnel 5 days after return from theatre and again 18 to 24 months later. These results, in conjunction with a third data collection point approximately 4 years later (Orcutt et al. 2004), supported the relationship between war exposure and the development of PTSD with increases in prevalence over time (3% at Time 1 and 8% at Time 2). Supported by modeling analysis, Orcutt and colleagues identified two distinct populations, those who became progressively less symptomatic and those who developed worsening symptoms of PTSD over time. In another interesting analysis of these data, Erickson et al. (2001) highlighted the important bidirectional relationship between depression and PTSD. Depressed service members were at higher risk to develop PTSD over time, and vice versa.

In a unique study, the entire cohort of 1871 Australian military service members deployed to the PG were interviewed using the Composite International Diagnostic Interview more than one decade after the conflict (Ikin et al., 2004). Postwar PTSD rates were 5.4% in the study group compared to 1.4% in the military control group.

Hoge and colleagues (2004) used both pre- and post-deployment measures of psychiatric symptoms in large combat infantry units deployed to the current conflicts in Iraq and Afghanistan. These authors provided the clearest window into the psychiatric impact of the ongoing combat operations in the Middle East. Using these authors' strict criteria for meeting threshold for depression, anxiety, or PTSD, prevalence rates of any mental disorder rose from 9.3% pre-deployment to 11.2% post deployment to Afghanistan, and to between 15.6 and 17.1% post-deploy-

ment to Iraq. Rates of PTSD rose from 5.0% pre-deployment to 6.2% post-deployment in the Afghanistan group, and to between 12.2% and 12.9% post-deployment in the Iraq group. Another major finding of this study, with broad public health implications, was that of those who screened positive for any mental disorder, only 23% to 40% sought mental health services. Reluctance to seek help was associated with stigmatization and other perceived barriers to care.

Combat exposure studies of all wars identify higher level of exposure as a significant contributor to PTSD development. Certain malignant types of combat-exposure also appear to place service members at particular risk. McCarroll et al. (1995) found higher levels of PTSD symptoms in PGW veterans who had handled human remains compared to those who had not. Significant differences between groups emerged at both Time 1 (3 to 5 months after returning) and Time 2 (1 year later). An Israeli study by Koren and colleagues (2005) emphasized the increased risk of PTSD in injured soldiers (16.7% prevalence at a mean time of 15.5 months postinjury) compared to uninjured but similarly combat-exposed soldiers (2.5%).

In conclusion, despite certain limitations, multiple studies regarding psychological sequelae of war show a clear association between combat exposure and PTSD, with greater levels of exposure leading to greater prevalence. These rates may fluctuate depending upon the nature of combat, changes in combat experiences during the course of a war, and the social context to which veterans return. Multiple questions remain pertaining to risk, comorbidity, and course of illness that require further investigation.

REFERENCES

JONES, F.D., SPARACINO, L.R., WILCOX, V.L., ROTHBERG, J.M., & STOLDS, J.W. (Eds.). (1995). *War Psychiatry*. Office of the Surgeon General, TMM Publications, Washington, DC.

URSANO, R.J., & NORWOOD, A.E. (Eds.). (1996). *Emotional aftermath of the Persian Gulf War: Veterans, families, communities, and nations*. American Psychiatric Press, Washington, D.C.

SELECTED ABSTRACTS

ENGEL, C.C. (2004). **Post-war syndromes: Illustrating the impact of the social psyche on notions of risk, responsibility, reason, and remedy.** *Journal of the American Academy of Psychoanalysis and Dynamic Psychiatry*, 32, 321-334. The 20th century offered many examples of post-war syndromes such as Da Costa's syndrome, irritable heart, shell shock, effort syndrome, medical evacuation syndrome, post-traumatic stress disorder, and Gulf War syndrome. These post-war syndromes occur under conditions of substantial medical and scientific uncertainty, conditions that potentially magnify the impact of social context on clinical care for these syndromes. This article reviews the social circumstances surrounding four post-war syndromes. The case is made that social context has significantly impacted professional and lay perceptions of causal mediators, relevant risk factors, defining symptoms, and appropriate therapies for these syndromes. Furthermore, it is argued that social context

influences what parties are held responsible for post-war syndromes, and what clinical disciplines are ultimately deemed appropriate to provide legitimate post-war illness care.

HOGE, C.W., CASTRO, C.A., MESSER, S.C., MCGURK, D., COTTING, D.I., & KOFFMAN, R.L. (2004). **Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care.** *New England Journal of Medicine*, 351, 13-22. *Background:* The current combat operations in Iraq and Afghanistan have involved U.S. military personnel in major ground combat and hazardous security duty. Studies are needed to systematically assess the mental health of members of the armed services who have participated in these operations and to inform policy with regard to the optimal delivery of mental health care to returning veterans. *Methods:* We studied members of four U.S. combat infantry units (three Army units and one Marine Corps unit) using an anonymous survey that was administered to the subjects either before their deployment to Iraq ($n=2530$) or three to four months after their return from combat duty in Iraq or Afghanistan ($n=3671$). The outcomes included major depression, generalized anxiety, and PTSD, which were evaluated on the basis of standardized, self-administered screening instruments. *Results:* Exposure to combat was significantly greater among those who were deployed to Iraq than among those deployed to Afghanistan. The percentage of study subjects whose responses met the screening criteria for major depression, generalized anxiety, or PTSD was significantly higher after duty in Iraq (15.6 to 17.1%) than after duty in Afghanistan (11.2%) or before deployment to Iraq (9.3%); the largest difference was in the rate of PTSD. Of those whose responses were positive for a mental disorder, only 23 to 40% sought mental health care. Those whose responses were positive for a mental disorder were twice as likely as those whose responses were negative to report concern about possible stigmatization and other barriers to seeking mental health care. *Conclusions:* This study provides an initial look at the mental health of members of the Army and the Marine Corps who were involved in combat operations in Iraq and Afghanistan. Our findings indicate that among the study groups there was a significant risk of mental health problems and that the subjects reported important barriers to receiving mental health services, particularly the perception of stigma among those most in need of such care.

THE IOWA PERSIAN GULF STUDY GROUP (1997). **Self-reported illness and health status among Gulf War veterans: A population-based study.** *Journal of the American Medical Association*, 277, 238-245. *Objective:* To assess the prevalence of self-reported symptoms and illnesses among military personnel deployed during the Persian Gulf War (PGW) and to compare the prevalence of these conditions with the prevalence among military personnel on active duty at the same time, but not deployed to the Persian Gulf (non-PGW). *Design:* Cross-sectional telephone interview survey of PGW and non-PGW military personnel. The study instrument consisted of validated questions, validated questionnaires, and investigator-derived questions designed to assess relevant medical and psychiatric conditions. *Setting:* Population-based sample of military personnel from Iowa. *Study Participants:* A total of 4,886 study subjects were randomly selected from 1 of 4 study domains (PGW regular military, PGW National Guard/Reserve, non-PGW regular military, and non-PGW National Guard/Reserve), stratifying for age, sex, race, rank, and branch of military service. *Main Outcome Measures:* Self-reported symptoms of medical illnesses and psychiatric conditions.

Results: Overall, 3,695 eligible study subjects (76%) and 91% of the located subjects completed the telephone interview. Compared with non-PGW military personnel, PGW military personnel reported a significantly higher prevalence of symptoms of depression, PTSD, chronic fatigue, cognitive dysfunction, bronchitis, asthma, fibromyalgia, alcohol abuse, anxiety, and sexual discomfort. Assessment of health-related quality of life demonstrated diminished mental and physical functioning scores for PGW military personnel. In almost all cases, larger differences between PGW and non-PGW military personnel were observed in the National Guard/Reserve comparison. Within the PGW military study population, compared with veterans in the regular military, veterans in the National Guard/Reserve only reported more symptoms of chronic fatigue and alcohol abuse. *Conclusions:* Military personnel who participated in the PGW have a higher self-reported prevalence of medical and psychiatric conditions than contemporary military personnel who were not deployed to the Persian Gulf. These findings establish the need to further investigate the potential etiologic, clinical, pathogenic, and public health implications of the increased prevalence of multiple medical and psychiatric conditions in populations of military personnel deployed to the Persian Gulf.

JONES, E., VERMAAS, R.H., McCARTNEY, H., BEECH, C., PALMER, I.P., HYAMS, K.C., & WESSELY, S.C. (2003). **Flashbacks and post-traumatic stress disorder: The genesis of a 20th century diagnosis.** *British Journal of Psychiatry*, 182, 158-163. *Background:* It has been argued that PTSD is a timeless condition, which existed before it was codified in modern diagnostic classifications but was described by different names such as 'railway spine' and 'shellshock'. Others have suggested that PTSD is a novel presentation that has resulted from a modern interaction between trauma and culture. *Aims:* To test whether one core symptom of PTSD, the flashback, has altered in prevalence over time in soldiers subjected to the intense stress of combat. *Method:* Random selections were made of UK servicemen who had fought in wars from 1854 onwards and who had been awarded war pensions for post-combat disorders. These were studied to evaluate the incidence of flashbacks in defined, at-risk populations. *Results:* The incidence of flashbacks was significantly greater in the most recent cohort, veterans of the 1991 Persian Gulf War; flashbacks were conspicuous by their absence in ex-servicemen from the Boer War and the First and Second World Wars. *Conclusions:* Although this study raises questions about changing interpretations of post-traumatic illness, it supports the hypothesis that some of the characteristics of PTSD are culture-bound. Earlier conflicts showed a greater emphasis on somatic symptoms.

JONES, E., & WESSELY, S. (2003). **"Forward psychiatry" in the military: Its origins and effectiveness.** *Journal of Traumatic Stress*, 16, 411-419. "Forward psychiatry" was devised in World War I for the treatment of shell shock and today is the standard intervention for combat stress reaction. It relied on three principles: proximity to battle, immediacy, and expectation of recovery, subsequently given the acronym PIE. Both US and UK forces belatedly reintroduced PIE methods during World War II to return servicemen to active duty and made confident claims for its efficacy. Advanced treatment units also appeared to have minimized psychiatric battle casualties during Korean and Vietnamese Wars. Evaluations of its use by Israeli forces in the Lebanon conflict showed higher return-to-duty rates than at base hospitals. A reexamination of these examples suggests that reported outcomes tended to exaggerate its effectiveness both as a treatment for acute stress reaction and as a prophylaxis for

chronic disorders such as PTSD. It remains uncertain who is being served by the intervention: whether it is the individual soldier or the needs of the military.

KOREN, D., NORMAN, D., COHEN, A., BERMAN, J., & KLEIN, E.M. (2005). **Increased PTSD risk with combat-related injury: A matched comparison study of injured and uninjured soldiers experiencing the same combat events.** *American Journal of Psychiatry* 162, 276-282. *Objective:* The aim of the present study was to isolate the unique contribution of physical injury to the subsequent development of PTSD. *Method:* Participants were 60 injured soldiers and a comparison group of 40 soldiers (matched by rank, military role, and length of service) who took part in the same combat situations but were not injured. Current and lifetime diagnoses were determined by using the Structured Clinical Interview for DSM-IV. In addition, an extensive battery of self-report questionnaires was given to assess severity of PTSD, anxiety, depression, and dissociative symptoms. The average time that elapsed between the injury and the interview was 15.5 months ($SD=7.3$). *Results:* Ten (16.7%) of the 60 injured survivors but only one (2.5%) of the 40 comparison soldiers met diagnostic criteria for PTSD at the time of the interview (odds ratio=8.6, 95% confidence interval=1.1-394.3). Moreover, wounded participants had significantly higher scores than their noninjured counterparts on all clinical measures. Finally, presence of PTSD was not related to severity of injury or severity of the trauma. *Conclusions:* The findings clearly indicate that bodily injury is a major risk—factor rather than a protective one—for PTSD. While supporting the notion that bodily injury contributes to the appraisal of the traumatic event as more dangerous, the data also suggest that this heightened level of perceived threat is not a simple, straightforward function of the severity of injury or of the traumatic event.

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. *Objective:* The authors explored whether individuals who participated in the recovery of war dead were more likely to experience later symptoms of PTSD than were individuals who were not involved in the recovery of war dead. *Method:* PTSD symptoms were assessed by questionnaire in men and women who had or had not handled human remains during the Persian Gulf War: 116 men and women who had and 118 who had not handled human remains participated in the study 3-5 months after returning from the war; 55 of the subjects who had and 56 of those who had not handled human remains participated in a follow-up assessment 13-15 months after their return. *Results:* Subjects who had been involved in the recovery of war dead had significantly higher symptom levels than comparison subjects at both time points. *Conclusions:* After more than 1 year, individuals who had handled human remains during wartime were at higher risk for PTSD symptoms than those who had not.

ORCUTT, H.K., ERICKSON, D.J., WOLFE, J. (2004). **The course of PTSD symptoms among Gulf War veterans: A growth mixture modeling approach.** *Journal of Traumatic Stress*, 17, 195-202. Relatively little is known about the course of PTSD symptoms over time following trauma exposure. Accordingly, this study utilized a specialized structural equation modeling approach, growth mixture modeling, to examine the trajectory of PTSD symptoms across three time points in a sample of Gulf War veterans (n at Time 1 = 2,949, n at Time 2 = 2,313, and n at Time 3 = 1,327). Results were most consistent with a two-group model

suggesting that the course of PTSD symptoms following the Gulf War was best characterized by two distinct growth curves: (1) low levels of PTSD symptoms with little increase over time and (2) higher levels of initial symptoms with a significant increase over time. Thus, it appears that response to Gulf War experiences is not homogeneous, and that a subset of individuals may experience relatively more PTSD symptoms over time. In addition, men, Whites, those reporting more education, and those reporting less combat exposure had a significantly higher probability of being classified into the less symptomatic group.

PERCONTE, S.T., WILSON, A.T., PONTIUS, E.B., DIETRICK, A.L., & SPIRO, K.J. (1993). **Psychological and war stress symptoms among deployed and non-deployed reservists following the Persian Gulf War.** *Military Medicine*, 158, 516-521. The present study examined the incidence of war-related psychological distress among Persian Gulf War veterans. A total of 591 Army, Navy, and Marine reservists were administered the Mississippi PTSD Scale, the Beck Depression Inventory, and the SCL-90R. Combat-deployed reservists showed significantly higher levels of psychological symptomatology than non-deployed reservists, generally corresponding to levels of stress exposure. No significant effects were found for race or prior combat exposure, but significant differences were found between combat-deployed male and female reservists. Despite the brevity and the outcome of the Persian Gulf War, significant symptomatology exists among this population.

SCHLENGER, W.E., KULKA, R.A., FAIRBANK, J.A., HOUGH, R.L., JORDAN, B.K., MARMAR, C.R., & WEISS, D.S. (1992). **The prevalence of post-traumatic stress disorder in the Vietnam generation: A multimethod, multisource assessment of psychiatric disorder.** *Journal of Traumatic Stress*, 5, 333-363. Findings from the Congressionally mandated National Vietnam Veterans Readjustment Study indicate that nearly one-half million Vietnam veterans—15.2% of the men and 8.5% of the women who served in Vietnam—suffer from PTSD fifteen or more years after their military service. Current PTSD prevalence rates for Vietnam veterans are significantly and substantially higher than the rates for their comparable Vietnam generation peers, which range from 0.3% to 2.5%. Additionally, the current prevalence rate among male Vietnam veterans was found to differ significantly among race/ethnicity subgroups: 27.9% among Hispanic men, 20.6% among black men, 13.7% among white/other men. Multivariate analyses indicated that although background factors are significantly related to the current prevalence of PTSD, the current prevalence is much higher among Vietnam veterans than among era veteran and civilian counterpart comparison groups even after background differences are taken into account. These analyses also demonstrated the important role of exposure to combat and other types of war zone stress in the current prevalence of the disorder.

SOLOMON, Z., & BENBENISHTY, R. (1986). **The role of proximity, immediacy, and expectancy in frontline treatment of combat stress reaction among Israelis in the Lebanon War.** *American Journal of Psychiatry*, 143, 613-617. The authors examined the effectiveness of the prevailing treatment doctrine stressing the principles of proximity, immediacy, and expectancy for combat stress reaction among Israeli soldiers in the Lebanon War. Two treatment outcomes were measured: return to military unit and presence of PTSD. All three treatment principles were associated with a higher rate of return to the military unit. The beneficial effect of frontline treatment was also evidenced

by lower rates of PTSD. The authors suggest that these principles can also be effective in treating other forms of PTSD.

SOUTHWICK, S.M., MORGAN, A., NAGY, L.M., BREMNER, J.D., NICOLAOU, A.L., JOHNSON, D.R., ROSENHECK, R.A., & CHARNEY, D.S. (1993). **Trauma-related symptoms in veterans of Operation Desert Storm: A preliminary report.** *American Journal of Psychiatry*, 150, 1524-1528. *Objective:* This study was designed to examine prospectively the development of trauma-related symptoms over time in two reserve units of Operation Desert Storm veterans. *Method:* 1 month and 6 months after returning from the Persian Gulf area, 84 National Guard reservists, from one medical unit and one military police unit, completed questionnaires on their exposure to combat and to specific stressors and rated the severity of their symptoms of PTSD on two different scales. Differences in symptom severity at the two time points were analyzed. *Results:* Scores on the Mississippi Scale for Combat-Related PTSD, but not severity ratings on a symptom scale based on DSM-III-R PTSD criteria, increased significantly from the 1-month to the 6-month rating time. At both time points, symptoms of hyperarousal were more severe than symptoms of reexperiencing or avoiding trauma-related events. Level of exposure to combat, as reflected by the Combat Exposure Scale and a Desert Storm trauma questionnaire, was significantly associated with score on the Mississippi PTSD scale. There were no significant differences in combat exposure and PTSD symptoms between the male and female subjects or between the medical and police units. *Conclusions:* These preliminary findings suggest that a high percentage of Desert Storm veterans experienced some trauma-related symptoms after returning to the United States. Six months after the war, these symptoms, although relatively mild, had not significantly improved in this study group as a whole. For research on longer-term outcome, follow-up of these 84 reservists continues.

STIMPSON, N.J., THOMAS, H.V., WEIGHTMAN, A.L., DUNSTAN, F., & LEWIS, G. (2003). **Psychiatric disorder in veterans of the Persian Gulf War of 1991: Systematic review.** *British Journal of Psychiatry*, 182, 391-403. *Background:* Veterans of the Persian Gulf War of 1991 have reported symptoms attributed to their military service. *Aims:* To review all studies comparing the prevalence of psychiatric disorders in Gulf War veterans and in a comparison group of service personnel not deployed to the Gulf War. *Method:* Studies of military personnel deployed to the Gulf published between 1990 and 2001 were identified from electronic databases. Reference lists and websites were searched and key researchers were contacted for information. A total of 2296 abstracts and 409 complete articles were reviewed and data were extracted independently by two members of the research team. *Results:* The prevalence of psychiatric disorder in 20 studies of Gulf War veterans was compared with the prevalence in the comparison group. Prevalence of PTSD and common mental disorder were higher in the Gulf War veterans. Heterogeneity between studies was significant, but all reported this increased prevalence. *Conclusions:* Veterans of the Persian Gulf War reported an increased prevalence of PTSD and common mental disorder compared with other active service personnel not deployed to the Gulf. These findings are attributable to the increase in psychologically traumatic events in wartime.

STRETCH, R.H., MARLOWE, D.H., WRIGHT, K.M., BLIESE, P.D., KNUDSON, K.H., & HOOVER, C.H. (1996). **Post-traumatic stress disorder symptoms among Gulf War veterans.** *Military Medicine*, 161, 407-410. This study assessed the prevalence of risk for development of PTSD symptoms among active

duty and reserve veterans from Pennsylvania and Hawaii who either deployed ($N = 1,524$) or did not deploy ($N = 2,727$) to the Persian Gulf as a result of Operation Desert Storm. All participants anonymously completed a survey questionnaire that included the Impact of Event Scale and the Brief Symptom Inventory. Results indicate the likelihood of PTSD symptoms in approximately 8.0% of active duty veterans and 9.3% of reserve veterans who deployed to the Persian Gulf. PTSD risk comparisons are made with other active duty Army veterans assessed 1 year earlier. Sources of trauma are presented and implications for future military deployments on potential risks for developing PTSD are discussed.

SUTKER, P.B., UDDO, M., BRAILEY, K., & ALLAIN, A.N. (1993). **War-zone trauma and stress-related symptoms in Operation Desert Shield/Storm (ODS) returnees.** *Journal of Social Issues*, 49, 33-50. A growing literature suggests that human beings are often negatively impacted by participation in military combat, but there have been few attempts to document the psychological effects of war stress in the masses of troops deployed to action. We chose to study the relationship of Operation Desert Shield / Storm (ODS) participation and symptoms of psychological distress in a comparison of 215 Army National Guard and Army Reserve troops who were activated to service in the Persian Gulf and returned to the States without seeking mental health treatment services and 60 troops from these same units who were activated but not deployed overseas. Negative psychological outcomes were measured within four to ten months from homecoming in three domains: negative mood states, symptoms of PTSD, and physical health complaints. Results indicated that as war-zone stress exposure increased, the frequency and severity of psychological symptoms were enhanced, providing correlational evidence of the adverse impact of war stress, at least among a subset of ODS returnees. As many as 16-24% of war-zone exposed troops exhibited levels of distress symptomatology sufficiently exaggerated to suggest the presence of mental disorders, specifically clinical depression and PTSD. Psychological symptoms were less frequently reported among troops classified in the lower war-zone stress exposure subset and those activated but not deployed to the Persian Gulf.

WESSELY, S., UNWIN, C., HOTOPF, M., HULL, L., ISMAIL, K., NICOLAOU, V., & DAVID, A. (2003). **Stability of recall of military hazards over time: Evidence from the Persian Gulf War of 1991.** *British Journal of Psychiatry*, 183, 314-322. *Background:* War time traumatic events are related to subsequent psychological and physical health, but quantifying the association is problematic. Memory changes over time and is influenced by psychological status. *Aims:* To use a large, two-stage cohort study of members of the UK armed forces to study changes in recall of both traumatic and 'toxic' hazards. *Method:* A questionnaire-based follow-up study assessed 2370 UK military personnel, repeating earlier questions about exposure to military hazards. *Results:* The k statistics for reporting of hazards were good for some exposures, but very low for others. Gulf veterans reported more exposures over time (no significant rise in the Bosnia cohort). In the Gulf cohort only, reporting new exposures was associated with worsening health perception, and forgetting previously reported exposures with improved perception. We found no association between physical health, psychological morbidity or post-traumatic stress disorder symptoms and endorsement or non-endorsement of exposures. *Conclusions:* Reporting of military hazards after a conflict is not static, and is associated with current self-rated perception of health. Self-report of exposures associated with media publicity needs to be treated with caution.

WOLFE, J., ERICKSON, D.J., SHARKANSKY, E.J., KING, D.W., & KING, L.A. (1999). **Course and predictors of posttraumatic stress disorder among Gulf War veterans: A prospective analysis.** *Journal of Consulting and Clinical Psychology*, 67, 520-528. Rates and predictors of PTSD over time are not well understood. This study is the first to look at the rates of PTSD immediately following war and 2 years later using a large cohort ($N = 2,949$) of Gulf War veterans. Using a cut score to indicate presumptive PTSD, 3% of participants exceeded the cutoff at Time 1 compared with 8% at Time 2. Those who exceeded the cutpoint at Time 1 were up to 20 times more likely to exceed the cutpoint at Time 2 than those who did not exceed the cutpoint at Time 1. Women and those with high levels of combat exposure were at increased risk for PTSD at both times. Being young, being single and having previous combat experience were associated with increased risk at Time 1 only, whereas reservists and enlisted personnel were at increased risk at Time 2 only. These findings indicate that, although low initially, rates of PTSD increased substantially over time.

ADDITIONAL CITATIONS Annotated by the Editor

BARRETT, D.H., DOEBBELING, C.C., SCHWARTZ, D.A., VOELKER, M.D., FALTER, K.H., WOOLSON, R.F., & DOEBBELING, B.N. (2002). **Posttraumatic stress disorder and self-reported physical health status among U.S. military personnel serving during the Gulf War period.** *Psychosomatics*, 43, 195-205.

The authors investigated PTSD and physical health in 3,862 Gulf War veterans and controls. Veterans screening positive for PTSD reported more health symptoms and lower health-related quality of life than did veterans without PTSD.

BLACK, D.W., CARNEY, C.P., FORMAN-HOFFMAN, V.L., LETUCHY, E., PELOSO, P., WOOLSON, R.F., & DOEBBELING, B.N. (2004). **Depression in veterans of the first Gulf War and comparable military controls.** *Annals of Clinical Psychiatry*, 16, 53-61.

Of the veterans studied in the Iowa Gulf War Case Validation study, 32% met DSM-IV criteria for current or lifetime major depressive disorder. Depressed deployed veterans showed higher comorbidity with other disorders, including PTSD (33% v. 10%), than did depressed non-deployed veterans. Lifetime substance use disorders were more frequent in deployed veterans than in non-deployed veterans (70% v. 52%).

ERICKSON, D.J., WOLFE, J., KING, D.W., KING, L.A., & SHARKANSKY, E.J. (2001). **Posttraumatic stress disorder and depression symptomatology in a sample of Gulf War veterans: A prospective analysis.** *Journal of Consulting and Clinical Psychology*, 69, 41-49.

Almost 3,000 Gulf War veterans were assessed immediately after their return and again 18-24 months later. A reciprocal relation between PTSD and depression emerged in cross-lag panel models. For re-experiencing and avoidance/numbing, the reciprocal model held. Early arousal affected later depression, but the reverse was not true.

IKIN, J.F., SIM, M.R., CREAMER, M.C., FORBES, A.B., MCKENZIE, D.P., KELSALL, H.L., GLASS, D.C., MCFARLANE, A.C., AMBRAMSON, M.J., ITTAK, P.,

DWYER, T., BLIZZARD, L., DELANEY, K.R., HORSLEY, K.W.A., HARREX, W.K., & SCHWARZ, H. (2004). **War-related psychological stressors and risk of psychological disorders in Australian veterans of the 1991 Gulf War.** *British Journal of Psychiatry*, 185, 116-126.

Prevalences of DSM-IV psychological disorders were measured in a sample of Australian Gulf War veterans and a military comparison group. A total of 31% of male Gulf War veterans and 21% of the comparison group met criteria for a DSM-IV disorder first present in the post-Gulf War period. Prevalences remained elevated a decade after deployment. There was a strong dose-response relationship between psychological disorders and number of reported Gulf War-related psychological stressors.

JONES, E., HODGINS-VERMAAS, R., MCCARTNEY, H., EVERITT, B., BEECH, C., POYNTER, D., PALMER, I.P., HYAMS, K.C., & WESSELY, S.C. (2002). **Post-combat syndromes from the Boer war to the Gulf war: A cluster analysis of their nature and attribution.** *British Medical Journal*, 324, 321-324.

The authors reviewed records for 1,856 randomly selected veterans dating from 1872 to the Gulf War. Three varieties of postcombat disorder (debility, somatic, neuropsychiatric) were identified and tied to the era of the war. The authors concluded that all modern wars have been associated with a syndrome of unexplained medical symptoms, but explanations were influenced by advances in medical science and cultural forces.

SOLOMON, Z. (1987). **Combat-related posttraumatic stress disorder among Israeli soldiers: A two-year follow-up.** *Bulletin of the Menninger Clinic*, 51, 80-95.

Posttraumatic stress disorder was assessed two years after the 1982 Lebanon War in a large representative sample of Israeli soldiers who had been treated for combat stress reactions. A high rate of PTSD (56%) was observed in those who had had combat stress reactions compared with a military control group (17%).

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.

In a two-year follow-up of 62 National Guard reservists, who had also been interviewed one and six months after their return from the Gulf War, scores on the Mississippi Scale for Combat-Related PTSD had increased over time. Level of combat exposure was predictive of two-year symptom scores although it had not predicted scores at earlier time-points. The authors concluded that it may take time for the consequences of traumatic exposure to become apparent.

SPIRO, A., SCHNURR, P.P., & ALDWIN, C.M. (1994). **Combat-related posttraumatic stress disorder symptoms in older men.** *Psychology and Aging*, 9, 17-26.

The relationship of PTSD symptoms to combat exposure was examined in 1,210 veterans of World War II and the Korean War, who were participants in the Normative Aging Study. The sample prevalence of PTSD by combat exposure ranged from 0% to 12.4%, differing by the PTSD measure. WWII veterans exposed to moderate or heavy combat had 13.3 times greater risk of PTSD symptoms measured 45 years later, compared with noncombatant veterans. It is suggested that military service in general, and combat exposure in particular, is a "hidden variable" in the study of aging men.

PILOTS UPDATE

Our colleagues in the Psychotrauma Documentation Network share our interest in the psychological and psychiatric consequences of traumatic events, but their concern often lies with a particular sort of trauma. Among those organizations working with survivors of traumatic events are several European groups active in human rights and refugee services. As they develop bibliographic databases, they are confronting the need to develop indexing vocabularies.

Last year the Rehabilitation Center for Torture Victims (RCT) announced plans to construct a Thesaurus of Torture Terminology. According to RCT's Documentation Centre, "The T3 project aims to create a structured vocabulary sufficiently extensive and detailed to facilitate indexing and retrieval of documents on torture, at a level suited to specialists in the fields of torture prevention and rehabilitation of victims." In December 2004, an International Working Group (IWG) was convened at RCT headquarters in Copenhagen to establish the principles on which T3 is to be constructed, to determine the procedures to be used in constructing the thesaurus, and to set a timeline for measuring progress. In order to take advantage of the experience gained by the National Center for PTSD in developing the PILOTS Thesaurus, Fred Lerner, Information Scientist at the National Center, was asked to serve as special consultant to the project.

In addition to purely technical matters, the IWG had to address some issues reflecting the political sensitivity of the subject matter. Users of the thesaurus must be explicitly told that it sets forth terminology for indexing literature about torture, rather than terminology to be used in documenting acts of torture for medical or forensic purposes. Although input is to be solicited from a wide range of individuals and organizations, RCT will assert ownership of the intellectual property rights in the completed thesaurus. This will allow RCT to prevent the dissemination of distorted versions of the thesaurus and the manipulation of its content in ways contrary to RCT's mission of opposing torture and human rights violations.

Those principles being decided, it remained to work out the process by which the thesaurus would be constructed, tested, and disseminated. The discussion was informed by the National Center's experience in thesaurus development, and the IWG decided to employ the approach that we used in producing the PILOTS Thesaurus.

Fifteen years ago, we derived the structure and terminology of the PILOTS Thesaurus from an examination of a representative sample of psychotrauma literature. Terms occurring in titles, abstracts, and reference lists were selected for their apparent relevance to the subject-matter of the thesaurus, and a list of those terms was compiled. By examination of this list, patterns of terms were perceived and broad categories outlined. Each of these categories then served as the basis for a hierarchical structure of subordinate terms to be used as descriptors for indexing individual documents.

Initial testing suggested that this methodology could successfully be applied to the torture literature, so the next step was to begin the process of developing a hierarchy of indexing terms. In the initial stage of the project, determining the relationships among the concepts is more important than deciding upon the exact terms to be included in the final thesaurus. As work progresses, specialists in various aspects of torture prevention and treatment will be asked for advice on detailed terminology to be applied to their areas of expertise. It is hoped that a first draft of the thesaurus will be ready for circulation and open for comments by October 2005. The goal of the T3 project is to improve access to the torture literature, so that those working to prevent torture and to alleviate its effects can incorporate the insights and experiences of colleagues worldwide into their own work. We at the National Center for PTSD are pleased that our own experience in bibliographic work is being applied to this task.

(Anyone interested in learning more about the Thesaurus of Torture Terminology may contact the T3 Project Coordinator, Sven-Erik Baun, at seb@rct.dk)

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