

# **Summary of the Military Mental Health and Traumatic Stress Literature: 2007**

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## **Australian Centre for Posttraumatic Mental Health**

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#### **Key Findings**

- Mental health problems are common in deployed personnel, although rates vary widely across countries. Symptoms are likely to increase over the months following return.
- As well as PTSD, depression and substance abuse are also common in veterans.
- There is increasing agreement that the impairment criteria in PTSD is of great importance in a “gate keeping” role; prevalence of PTSD rises dramatically if this criterion is removed.
- In line with previous research, strong predictors of later PTSD include acute responses (within the first few days), younger age, female gender, history of childhood adversity, lower IQ and poor pre-trauma cognitive ability.
- Women with a history of interpersonal trauma are at particularly high risk following later trauma exposure.
- Long deployments carry an increased risk for PTSD; discrepancy between expected and actual duration is also an important risk factor.
- PTSD is associated with increased rates of several physical health problems, including cardiovascular disease.
- High levels of physiological and psychological stress are apparent in dependents of deployed personnel, as well as in partners of veterans diagnosed with PTSD.
- Contrary to much previous research, a large prospective US study found that veterans were twice as likely as civilians to die from suicide (although, interestingly, they were no more likely to die of other causes).
- Trauma focussed cognitive behaviour therapy (CBT), and particularly prolonged exposure, is now internationally recognised as the treatment of choice for PTSD.
- A significant proportion of veterans (like civilians) with mental health problems do not seek treatment. Treatment seeking is more likely among younger veterans with more severe symptoms.
- Recent technological advancements have produced promising new treatment options such as internet-based therapy and telepsychiatry.



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#### **Introduction**

This annual summary of the military mental health literature was produced by the Australian Centre for Posttraumatic Mental Health (ACPMH). The aim is to provide a brief summary of key literature pertaining to military mental health, as well as posttraumatic mental health more generally, published during the calendar year of 2007. The aim is not to provide a critical review; rather to draw the reader's attention to a selection of articles that were published during the year that we felt were important contributions. Since we do not provide a critique of the research, we strongly recommend that readers interested in a particular paper obtain a copy of the original and read it for themselves.

#### **Search Strategy and Content Overview**

The literature was sourced using standard scientific databases, notably Medline, Web of Science and PsychInfo, with the following search descriptors: veteran\* or defense or defence or military AND mental health or psych\*. Most of those selected for inclusion in this annual summary appeared in relatively prestigious journals, although some are included from less established publications when appropriate.

A total of eighty-two articles are included in this year's summary. We have divided the literature into several areas, although allocation to these categories was not always straightforward since papers often spanned more than one area.

#### **Special Issues and Reports**

A special issue of the Journal of Anxiety Disorders (Vol 21, Issue 2) addressed critical issues and core assumptions underlying the diagnostic construct of posttraumatic stress disorder (PTSD). Various papers debate the benefits of retaining the diagnosis, question several of the key assumptions underlying the diagnosis, and propose strategies to tighten definitional criteria for traumatic events and posttraumatic symptoms (Rosen & Frueh, 2007; Spitzer, First, & Wakefield, 2007).

In 1988, the National Vietnam Veterans Readjustment Study (NVVRS) reported 30% lifetime and 15% current rates of PTSD, and a strong dose/response relationship with retrospective reports of combat exposure. Skeptics argued that recall bias and other flaws inflated the results. Using a new record-based exposure measure and diagnoses in an NVVRS subsample, Dohrenwend et al. (2007) found little evidence of falsification, an even stronger dose/response relationship and, when fully adjusted for impairment and evidence of exposure, 19% lifetime and 9% current rates of war-related PTSD. These findings were published in high profile journals (e.g., Science) in 2006, but generated so much debate that the

controversy continued well into 2007 with a special issue of *Journal of Traumatic Stress* (Vol 20, Issue 4) canvassing a range of opinions on the revised findings (McNally, 2007; Schlenger et al., 2007).

Two important reports were published on line by the US Institute of Medicine in 2007 (see [www.iom.edu](http://www.iom.edu)). These scientific reviews were commissioned by congress and followed the 2006 IOM report on the diagnosis and assessment of PTSD. The first 2007 report, *"PTSD, Compensation and Military Service"*, while concluding that compensation was not a disincentive to seeking treatment, devoted most attention to the poor quality of current disability assessments. The second, *"PTSD Treatment: An Assessment of the Evidence"*, concluded that the only treatment with adequate empirical support is the trauma focused psychological intervention of prolonged exposure.

### **Phenomenology, Diagnosis and Assessment**

The DSM-IV definition of PTSD requires clinically significant distress or impairment (Criterion F). Breslau & Alvarado (2007) examined the significance of criterion F and discovered that inclusion of this criterion reduced the conditional probability of PTSD following trauma exposure by approximately 30%. Cases that met criterion F showed more pervasive and persistent disturbance and an excess in impaired activity days.

Since the diagnosis of delayed-onset PTSD was introduced in DSM-III, there has been controversy over its prevalence and even its existence. Andrews et al., (2007) conducted a systematic literature review and noted that delayed-onset PTSD in the absence of any prior symptoms was rare. Delayed onsets that represented exacerbations or reactivations of prior symptoms, however, accounted on average for 38% and 15% of military and civilian cases of PTSD respectively. The discrepant findings in the literature concerning prevalence can be largely, but not completely, explained as being due to definitional issues. Little is known about what distinguishes the delayed-onset and immediate-onset forms of the disorder. The authors argue that scientific study of delayed-onset PTSD would benefit if future editions of DSM adopted a definition that explicitly accepts the likelihood of at least some prior symptoms.

Criterion A of the PTSD diagnosis requires that the person has experienced a traumatic event. The question of how severe the experience must be to qualify has been a matter of great debate for some time and is often referred to as "the Criterion A problem". It raises many fundamental issues regarding the definition and measurement of psychological trauma. Weathers & Keane (2007) provide an update on the Criterion A problem, with particular emphasis on the evolution of the DSM definition of the stressor criterion and the ongoing debate regarding broad versus narrow conceptualizations of traumatic events.

## **Epidemiology**

Several papers in 2007 focused on the prevalence of mental health problems in military members. In a twenty year follow-up study, Solomon and Horesh (2007) assessed veterans from the Lebanon war and the Yom Kipur war and found that PTSD rates had generally increased since the group were last assessed 17 years ago. Importantly, however, rates declined when DSM-IV criteria were applied. In particular, their findings demonstrated the importance of including the impairment criterion (F) when making diagnoses of PTSD, an issue discussed widely in the context of the NVVRS re-analysis noted above as well as in a recent study by Breslau noted below under "*Phenomenology*".

In a large study of Canadian forces Sareen, Cox, & Afifi et al. (2007) found that deployment to combat operations and witnessing atrocities were associated with increased prevalence of mental disorders. The prevalence of any past-year mental disorder assessed in the survey was 15%. Interestingly, after adjusting for the effects of exposure to combat and witnessing atrocities, deployment to peacekeeping operations was not associated with increased prevalence of mental disorders. (See further discussion of this study under "*Treatment*"). Rundell (2007) investigated the incidence of medical evacuations due to somatoform disorders and found the level to be extremely low at only 3%. These personnel were more likely to have non-combat deployment stressors and past psychiatric histories.

Questionnaire studies have shown increased mental health problems, including probable PTSD, in soldiers deployed to Iraq. Engelhard et al., (2007), however, conducted a study on Dutch infantry troops to test prospectively whether these problems change over time and whether questionnaires provide accurate estimates of deployment-related PTSD compared with a clinical interview. Three cohorts completed questionnaires before deployment to Iraq, and about five months and fifteen months thereafter. There was no difference in general distress symptoms over time and the effects of deployment on mental health were apparent only for a small minority of that sample. Importantly, they also found that questionnaires eliciting stress symptoms gave overestimations of the rate of PTSD.

That finding is in contrast to much of the US data. In another paper in the series by Hoge and colleagues, Milliken, Auchterlonie, & Hoge, (2007) report on mental health care utilization of US soldiers returning from Iraq. Soldiers completed both a Post-Deployment Health Assessment (PDHA) and a Post-Deployment Health Re-Assessment (PDHRA) with a median of six months between the two assessments. Results demonstrated that soldiers reported more mental health concerns and were referred at significantly higher rates from the PDHRA than from the PDHA, suggesting a progressive recruitment of symptoms in the months following return home.

A study conducted within the British military confirmed the increasingly common finding that depression was the most common diagnosis (33%) among admissions to British Armed

Forces mental health hospitals, with PTSD accounting for only 7% (Finnegan, Finnegan, & Gamble, 2007). In a study of more chronic outcomes, Toomey et al., (2007) assessed the prevalence of mental disorders in British veterans ten years after the Gulf War. War-era onset mental disorders were twice as prevalent in deployed veterans compared with non-deployed veterans. The prevalence of depression and anxiety had declined ten years later in both groups, but remained higher in the deployed group, who also reported more symptoms and a lower quality of life than the non-deployed group.

Other studies looked at the prevalence of PTSD across different groups of veterans. Frueh et al., (2007), for example, analysed data from Veterans Affairs primary care clinics and found that, despite having higher rates of combat exposure, older veterans (65 years or more) had one-third the prevalence of PTSD than those in the middle-aged (45 – 64 year) group. A similar pattern was found across other psychiatric diagnoses.

A review by Seal et al., (2007) of Operation Enduring Freedom and Iraqi Freedom (OEF/OIF) veterans seen at Department of Veterans Affairs health care facilities found that 25% received mental health diagnosis; 56% of those had two or more distinct mental health diagnoses. The youngest group of OEF/OIF veterans (age, 18-24 years) were at greatest risk for receiving mental health diagnoses.

In a study on risk and resilience factors for PTSD symptomatology in Gulf War I veterans, Vogt & Tanner (2007) reported that war-zone factors accounted for the largest proportion of variance in PTSD. Comparisons with other datasets, however, illustrated that the mechanisms underlying PTSD may be similar across veteran cohorts.

**New Recruits.** Stander, Merrill, Thomsen & Milner (2007) reported that 15% of new British Navy recruits were experiencing measurable symptoms of PTSD. While they note that this rate is comparable to civilian young adult populations, it might be considered high for a specially selected military population. Similarly Warner et al., (2007) conducted a cross-sectional anonymous survey of US soldiers in advanced individual training. Eleven percent reported a psychiatric history, 26% reported a history of abuse, and 16% endorsed moderate or severe current depressive symptoms.

**Family.** Surprisingly little is known about how family members respond to the stress of a parental deployment to war zones. In an unusual study of psychophysiology, Barnes, Davis and Treiber (2007) explored the impact of deployment to Operation Iraqi Freedom on heart rate, blood pressure and self-report stress levels. They compared dependants with a family member deployed, dependents with no family members deployed, and civilian dependents. Dependents with a deployed parent exhibited significantly higher heart rate than other groups. Manguno-Mire et al., (2007) looked at psychological distress among cohabitating female partners of combat veterans with PTSD. Partners endorsed high levels of psychological distress, with elevations on clinical scales at or exceeding the 90th percentile. Severe levels

of overall psychological distress, depression, and suicidal ideation were prevalent among partners.

**Road Traffic Accidents.** Few investigations have assessed PTSD after injury in large samples across diverse acute care hospital settings. Zatzick et al., (2007) conducted a study on injured trauma survivors aged 18-84 who were representative of in-patients from 69 hospitals across the USA. Approximately 23% of injury survivors had symptoms consistent with a diagnosis of PTSD 12 months after their hospitalization (a figure considerably higher than that reported in the Australian data). Pre-injury, intensive care unit admission, pre-injury depression, benzodiazepine prescription, and intentional injury were independently associated with an increased risk of symptoms consistent with a PTSD diagnosis.

### **Mental Health and Related Outcomes**

The association between combat exposure, PTSD, and other health outcomes was further investigated by several researchers in 2007. Hoge et al., (2007), in their study on US soldiers returning from combat duty in Iraq, found that PTSD was associated with lower ratings of general health, more sick call visits, more missed workdays, more physical symptoms, and higher somatic symptom severity.

A further US study compared the severity of combat-related PTSD versus non-combat related PTSD. This study comprised American Indian and Hispanic veterans and found that those with combat-related PTSD had more severe posttraumatic symptoms, were less likely to have remitted from PTSD during the last year, and were less likely to have sought mental health treatment since military duty (Brinker, Westermeyer, Thuras, & Canive, 2007).

**Alcohol.** In a review of alcohol use in the UK Armed Forces, Iverson et al. (2007) found that heavy drinking was associated with current military service and being unmarried or separated/divorced. Heavy drinking was more common in younger personnel who had deployed to Bosnia; those who drank heavily were also more likely to smoke; and heavy drinking was associated with poorer subjective physical and mental health.

**Aggression.** Taft et al., (2007) examined the association between PTSD and aggressive behavior among male Vietnam veterans. The hyperarousal PTSD symptom cluster showed a significant positive relationship with aggression, while avoidance and numbing symptoms were negatively associated with aggression.

Jakupcak et al (2007) explored PTSD and anger in Iraq and Afghanistan War veterans. Veterans who screened positive for PTSD reported significantly greater anger and hostility than those in the subthreshold-PTSD and non-PTSD groups. These findings reinforce the importance of screening for anger and aggression among veterans who exhibit symptoms of

PTSD, as well as the importance of incorporating relevant anger treatments into early intervention strategies.

**Memory.** Studies have come to conflicting conclusions about whether PTSD is associated with poorer memory for emotionally neutral information. Brewin et al., (2007) conducted a meta-analysis of twenty-seven studies that investigated verbal and/or visual memory in samples with PTSD and healthy controls. The results indicated that the association between PTSD and memory impairment appears to be robust, small to moderate in size, and stronger for verbal than for visual memory.

**Resilience.** The growing recognition of traumatic exposure in the general population has given increased salience to the need to understand the concept of resilience. Hoge, Austin & Pollack (2007) provide a review of psychological and biological factors that may confer resilience to the development of PTSD, although the available data are very limited. Bonanno et al., (2007) examined predictors of resilience following the 9/11 terrorist attacks. Resilience was uniquely predicted by gender, age, race/ethnicity, education, level of trauma exposure, income change, social support, frequency of chronic disease, and recent and past life stressors.

With regard to organizational factors in resilience, Brailey et al., (2007) predicted that unit cohesion would attenuate the dose-response relationship between past stressor exposures and PTSD symptoms at relatively moderate levels of exposure. Consistent with this hypothesis, regression analysis revealed that life experiences and unit cohesion strongly and independently predicted PTSD symptoms, and that unit cohesion attenuated the impact of life experiences on PTSD.

**Grief.** Neria et al., (2007) conducted a web-based survey of bereaved adults following the 9/11 terrorist attacks in order to examine the prevalence and correlates of complicated grief (CG) 2.5-3.5 years after the attacks. A surprisingly high 43% of bereaved adults across the US screened positive for CG. In multivariate analyses, CG was associated with female gender, loss of a child, death of loved one at the World Trade Center, and live exposure to coverage of the attacks on television.

**Disability and Physical Health.** Various correlates of PTSD, such as high levels of sympathetic activation and hypothalamic-pituitary-adrenal axis dysregulation, have been linked to arterial damage and coronary heart disease (CHD) risk. While psychological disturbance is frequently found among patients with cardiac disease, whether psychological problems precede, or occur as a result of, having a potentially fatal disease has not been clear. A landmark study by Kubzansky et al., (2007) is the first to demonstrate a prospective association between PTSD symptoms and CHD even after controlling for depressive symptoms. These results suggest that a higher level of PTSD symptoms may increase the risk of incident-CHD in older men.

Sareen et al., (2007) reported that, after adjusting for sociodemographic factors and other mental disorders, PTSD remained significantly associated with several physical health problems including cardiovascular diseases, respiratory diseases, chronic pain conditions, gastrointestinal illnesses, and cancer. After adjusting for sociodemographic factors, mental disorders, and severity of physical disorders, PTSD was associated with suicide attempts, poor quality of life, and short- and long-term disability.

**Suicide.** Exploring the relationship between PTSD and suicide, Bell & Nye (2007) studied 50 Vietnam combat veterans to detect which PTSD symptom cluster was most associated with suicidal ideation. The results suggested the importance of reexperiencing symptoms for predicting which individuals with combat-related PTSD are most at risk for suicidal ideation and behavior. In another US study, Belik et al., (2007) found that interpersonal traumas and exposure to three or more types of traumatic events was particularly associated with suicidal behaviour. This was above and beyond the effect of sociodemographics, mental disorders, and physical disorders assessed in the survey.

Most suicide research focuses on suicidal ideation and attempts, rather than on mortality from suicide. Kaplan et al., (2007), however, completed a large scale prospective study (N=320,890) using the National Health Interview Survey (NHIS) to assess the risk of mortality from suicide among male veterans. They found that veterans who were white, those with  $\geq 12$  years of education and those with activity limitations were at greater risk for completing suicide. Veterans represented 15.7% of the 1986-94 NHIS sample but accounted for 31.1% of the completed suicides. They concluded that veterans were twice as likely to die of suicide compared with non-veterans in the general population.

### **Predictors of Mental Health Outcome.**

**Acute Symptoms.** A 20-year longitudinal study by Solomon & Mikulincer (2007) demonstrated the long term impact of acute combat stress reaction (CSR). They assessed intrusion, avoidance, and social functioning at 20 years post-war among Israeli combat veterans from the first Lebanon War. They compared those who had and had not received a diagnosis of CSR during the conflict. CSR veterans reported higher intrusion and avoidance 20 years later than did non-CSR veterans.

In a longitudinal study of primarily male, Hispanic survivors of community violence, Denson et al., (2007) investigated the effects of demographic characteristics, pretrauma psychological factors, characteristics of the trauma, and reactions to the trauma on subsequent PTSD symptom severity. Replicating past research, variables from all four categories predicted PTSD symptom severity at twelve-month follow-up. Acute symptom severity, measured approximately five days posttrauma, accounted for the largest proportion of variance among all the predictors included. These results bear on current conceptions of

the fundamental nature of PTSD and suggest that initial distress during the immediate aftermath of the trauma may be an important target for intervention. They also highlight the importance of effective screening in the aftermath of trauma exposure.

A prospective longitudinal study by Kleim, Ehlers, & Glucksman, (2007) investigated the prognostic validity of acute stress disorder (ASD), of variables derived from a meta-analysis of risk factors for PTSD, and of candidate cognitive and biological variables in predicting chronic PTSD following assault. Interestingly, ASD was not the strongest predictor. When all predictors were considered simultaneously, mental defeat, rumination and prior problems with anxiety or depression emerged as the best combination.

**Gender.** In a civilian sample of relevance to the military, Breslau & Anthony (2007) examined the sensitizing effects of a prior trauma on PTSD in response to a subsequent trauma. Results confirmed previous findings that women's risk for PTSD following assaultive violence was higher than men's. Importantly, however, they found that when assaultive violence preceded a later nonassaultive trauma in women, there was an increased risk for PTSD following the later event which was not observed in men. These findings suggest that assaultive violence elicits women's PTSD response directly, as well as by sensitizing them to the effects of subsequent traumatic events of lesser magnitude. Trauma history is presumably an important factor to consider in recruitment of women to the military.

**Childhood adversity.** Copeland et al., (2007) examined the developmental epidemiology of potential trauma and PTSD in a longitudinal community sample of children. Results indicated that, in the general child population, potentially traumatic events are fairly common and do not often result in PTSD symptoms except after multiple traumas or a history of anxiety. Less than 0.5% of children met the criteria for full-blown DSM-IV PTSD. Apart from PTSD, traumatic events were related to many forms of psychopathology, with the strongest links being with anxiety and depressive disorders.

Childhood adversity has been associated with increased risk of developing PTSD in adulthood. Cabrera et al., (2007) reported on surveys administered to male soldiers who had, and had not, deployed to Iraq. They found that the likelihood of screening positive for depression and PTSD was significantly higher for US soldiers reporting exposure to two or more categories of childhood adversity. Adverse childhood experiences were a significant predictor of mental health symptoms beyond the expected contribution of combat.

Gahm et al., (2007) reviewed intake screening data of soldiers presenting to an outpatient mental health clinic. While age, gender, military rank, and childhood adversity were significant predictors of PTSD and depression, a history of deployment to a combat zone predicted PTSD but not depression.

Developmental capacities and childhood adversity may increase not only adjustment following trauma but also risk of trauma exposure itself. Koenen et al., (2007) examined the association between childhood neurodevelopmental, temperamental, behavioral and family environmental characteristics assessed before age eleven years and the development of PTSD up to age 32 years in a large birth cohort study. Two sets of childhood risk factors were identified. The first set was associated both with increased risk of trauma exposure and with PTSD assessed at age 26. These included childhood externalizing characteristics and family environmental stressors, specifically maternal distress and loss of a parent. The second set of risk factors affected risk for PTSD only and included low IQ and chronic environmental adversity. Low IQ at age five, antisocial behavior, and poverty before age eleven continued to predict PTSD related to traumatic events that occurred between the ages of 26 and 32.

Few studies have distinguished effects of childhood trauma from effects of current Axis I psychopathology on adult psychophysiological reactivity. Pole et al., (2007) exposed psychiatrically healthy police cadets to startling sounds under increasing threat of shock while assessing their eye blink electromyogram (EMG), skin conductance (SC), and heart rate responses. Cadets reporting childhood trauma reported less positive emotion and showed greater SC responses across all threat levels. Results suggest that childhood trauma may lead to long-lasting alterations in emotional and psychophysiological reactivity even in the absence of current Axis I psychopathology.

**Somatics.** Although previous research has suggested that increased physiological arousal is important in the genesis of PTSD, the data are conflicting. In assessing acute heart rate (HR) as a predictor of subsequent PTSD, O'Donnell et al., (2007) found that only HR change scores (phasic-tonic HR) were significant, not absolute levels. The strongest predictor of PTSD was self reported arousal as assessed by endorsement of somatic symptoms on the Beck Anxiety Inventory (BAI).

**Cognition.** In a similar vein to the childhood IQ data noted above, a twin study of male Vietnam-era veterans found a significant dose-response relationship between pre-exposure cognitive ability and risk for PTSD (Kremen et al. (2007). After controlling for confounders, the highest cognitive ability quartile had a 48% lower risk of developing PTSD than the lowest ability quartile.

Parslow & Jorm (2007) assessed whether neurocognitive deficits in people with PTSD symptoms were a consequence of those symptoms or represented a preexisting vulnerability factor for developing those symptoms after exposure to a serious bushfire. Higher levels of fire-related reexperiencing and arousal symptoms were consistently associated with having poorer pretrauma scores on all five neurocognitive measures available for this study. These results suggest that poor cognitive functioning may be a vulnerability factor for developing PTSD, not simply an outcome of PTSD symptoms.

**Combat.** Often referred to as “the forgotten war”, Korean veterans are an understudied population. A recent survey of Australian Korean War veterans (Ikin et al., 2007) found that PTSD, anxiety and depression were more prevalent in veterans than in an age-matched community comparison group. These disorders were strongly associated with heavy combat and low rank.

In contrast, two studies did not report an association between combat exposure and likelihood of mental health diagnosis. Rona et al., (2007) conducted two cross-sectional studies to assess the effects of deployment to the Gulf and Iraq Wars in British troops. They reported an increase in psychological symptoms, including alcohol misuse, in those *not* deployed, especially in women. Also in the UK, Browne et al (2007) investigated an apparent increase in health problems for reserve members who had deployed to Iraq. Most health outcomes could be explained by role, experience of traumatic events, or unit cohesion in theatre. PTSD symptoms were the one exception and were, paradoxically, more powerfully affected by differences in problems at home than by events in Iraq.

The impact of frequency and duration of deployment on mental health among UK armed forces personnel was explored by Rona et al., (2007). They found that personnel who were deployed for 13 months or more were at increased risk of PTSD, were more likely to reach caseness on the General Health Questionnaire, and were more likely to have multiple physical symptoms. The association between number of deployments and mental health was less consistent. Importantly, PTSD was also associated with a mismatch between expectations about the duration of deployment and the reality. These results support the need for clear and explicit policy on the duration of each deployment.

**Occupation.** Perrin et al., (2007) compared the prevalence and risk factors of current probable PTSD across different occupations involved in rescue/recovery work at the World Trade Center site. The overall prevalence of PTSD among rescue/recovery workers was 12.4%. After adjustments, the greatest risk of developing PTSD was seen among construction/engineering workers, sanitation workers, and unaffiliated volunteers. The authors conclude that workers and volunteers in occupations least likely to have had prior disaster training or experience were at greatest risk of PTSD.

## **Biology**

Developments in the field of neuroimaging have allowed researchers to look at the structural and functional properties of the brain in PTSD. Francati, Vermetten, & Bremner, (2007) summarize the findings with regard to PTSD in the functional imaging techniques of single-photon emission computed tomography (SPECT), positron emission tomography (PET), and functional magnetic resonance imaging (fMRI). In a structural MRI study, Yehuda et al., (2007) demonstrated that veterans with PTSD did not differ from those without PTSD in

hippocampal volume. Smaller left hippocampal volumes were observed in veterans who developed PTSD in response to their first reported traumatic exposure, supporting the contention that it may be a vulnerability factor

Research regarding the relationship between PTSD and cortisol levels has provided conflicting results. Meewisse et al., (2007) conducted a systematic review and meta-analysis of the field, concluding that low cortisol levels in PTSD are only found under certain conditions. In a related study, De Kloet et al. (2007) reported that enhanced cortisol suppression to dexamethasone was related to trauma exposure and not specifically to PTSD.

Conditioning models have long been central to our understanding of the development of PTSD. Wessa & Flor (2007) used a complex differential conditioning paradigm with PTSD patients, trauma-exposed subjects without PTSD, and healthy comparison subjects. PTSD patients exhibited enhanced conditioned responses to trauma reminders during acquisition, impaired extinction, and enhanced peripheral and brain responses. These findings suggest that PTSD may be maintained by second-order conditioning where trauma-relevant cues come to serve as unconditioned stimuli, thus generalizing enhanced emotional responses to many previously neutral cues and impeding extinction.

**Pain.** Geuze et al. (2007) examined the neural correlates of pain processing in patients with PTSD in response to heat stimuli. Patients with PTSD rated temperatures as less painful than controls, providing evidence of reduced pain sensitivity in PTSD.

**Psychophysiology.** Pole et al., (2007), in a meta-analysis of the psychophysiology of PTSD, reported that the most robust correlates of PTSD were skin conductance habituation, facial EMG during idiographic trauma cues, and heart rate during all study types. They cautioned, however, that the generalisability of these findings was limited by characteristics of the published literature, including its disproportionate focus on male veterans and neglect of potential PTSD subtypes.

**Genetics.** Although extensive research has appeared recently on the genetic bases of psychiatric disorders, little is known about polygenetic influences in PTSD. Broekman & Olf (2007) reviewed genetic studies relating to PTSD and noted highly inconsistent results, many of which may be attributable to methodological shortcomings and insufficient statistical power. They suggest that gene-environmental studies are required to focus more narrowly on specific, distinct endophenotypes and on influences from environmental factors. In a related article, Koenen, (2007) reviews the evidence from family, twin, and molecular genetic studies for genetic influences on PTSD and provided recommendations for future studies.

## **Treatment**

In 2007 the *Australian Guidelines for the Treatment of Adults with Acute Stress Disorder and Posttraumatic Stress Disorder* were developed by the Australian Centre for Posttraumatic Mental Health (ACPMH) in collaboration with Australian trauma experts and a multidisciplinary panel of health practitioners and mental health service users. The guidelines were based on a systematic literature review of outcome research and were endorsed by the National Health and Medical Research Council (NHMRC). They are available for free download at [www.acpmh.unimelb.edu.au](http://www.acpmh.unimelb.edu.au). Two journal articles; Forbes, Creamer, Phelps, Bryant et al., (2007) and Forbes, Creamer, Phelps, Couineau et al., (2007) address the Guidelines in detail.

**Treatment Seeking.** A study by Fikretoglu et al., (2007) of PTSD and other mental health conditions in the Canadian military found that only two-thirds of those with PTSD consulted with a professional regarding mental health problems. Those with comorbid depression were 3.75 times more likely to have sought treatment than those without. Another Canadian study found that psychological treatment use intensity (number of visits) was predicted by younger age, greater PTSD severity and health problems. Medical use intensity was significantly predicted by married status, greater depression and health problems (Elhai, Richardson, & Pedlar, 2007). The association between age and treatment seeking was also demonstrated by Sayer et al., (2007) in their study of 154 veterans. Using a multivariate logistic regression analysis, they found treatment use was associated with younger age, marriage, and dependence on public insurance.

Laffaye, Rosen, Schnurr, & Friedman (2007) reviewed the empirical literature to examine how seeking compensation and/or being awarded compensation for PTSD-related disability were associated with participation in mental health treatment and course of recovery. The literature indicates that veterans who are seeking or have been awarded compensation participate in treatment at similar or higher rates than do their non-compensation-seeking counterparts.

Gould, Greenberg, & Hetherton's.(2007) quasi-experimental study found that Trauma Risk Management (TRiM) training (a simple early intervention model used by sections of the British military) significantly improved attitudes about PTSD, stress, and help-seeking from TRiM-trained personnel. There was a nonsignificant effect on attitudes to seeking help from normal military support networks and on general health. The results suggest that TRiM is a promising anti-stigma program within organisational settings.

Sareen et al., (2007) examined the relationships between combat and peacekeeping operations and the prevalence of mental disorders, self-perceived need for mental health care, mental health service use, and suicidality. The prevalence of any past-year mental disorder assessed in the survey and self-perceived need for care were 14.9% and 23.2%

respectively. Most individuals meeting the criteria for a mental disorder diagnosis did not use any mental health services. Deployment to combat operations and witnessing atrocities were associated with increased perceived need for care.

**Early Intervention.** Resnick et al., (2007) conducted a randomized between-group design to evaluate the efficacy of a video intervention to reduce PTSD and other mental health problems following sexual assault. The intervention was implemented prior to the forensic medical examination. It seemed to be particularly effective (compared to the control condition) for those women with a prior rape history, but less so for those without. In another brief early intervention study, Sijbrandij et al.(2007) evaluated the efficacy of brief CBT for patients with acute PTSD resulting from various types of psychological trauma. They found that brief early CBT accelerated recovery from symptoms of acute PTSD but did not influence long-term outcome.

Patients attending accident and emergency (A&E) may develop long-term psychological difficulties and psychoeducation has been suggested to reduce the risk of post-injury disorders. Scholes, Turpin, & Mason (2007) tested the efficacy of providing self-help information to a high-risk sample. Results demonstrated that PTSD, anxiety and depression decreased across time for all subjects but that there were no group differences in these measures or quality of life. This research adds to the growing body of evidence questioning the benefits of providing psychoeducation in isolation.

**PTSD Treatment.** Trauma focussed cognitive behaviour therapy (CBT) is widely recognised as the treatment of choice for PTSD. Further evidence was provided by a study by Schnurr et al. (2007) of female veterans and serving personnel. Those who received prolonged exposure experienced greater reduction of PTSD symptoms than women who received a supportive intervention. The prolonged exposure group was more likely than the supportive therapy group to no longer meet PTSD diagnostic criteria and to achieve total remission.

Levitt et al., (2007) conducted an effectiveness study to evaluate the flexible application of a manualized CBT intervention for PTSD and related symptoms in survivors of the 9/11 terrorist attack on the World Trade Center. Results demonstrated significant pre-post reductions in symptoms of PTSD and depression for the flexible application of the treatment. A benchmarking analysis revealed that the moderate-to-large effect sizes found for these variables were similar to those obtained in a randomised controlled trial of the same treatment.

Recent technological advancement has influenced the treatment options available to clients. Frueh et al., (2007) did not find a significant difference in outcome between telepsychiatry and same-room treatment of combat-related PTSD. Attendance and drop-out

were similar in the two groups, although the same-room group reported more comfort in talking with their therapist at post-treatment and had better treatment adherence.

In a study of web-based intervention, Litz et al., (2007) conducted an eight-week randomized, controlled trial of therapist-assisted, internet-based, self-management CBT versus internet-based supportive counseling for PTSD. Results indicated that the dropout rate was similar to regular CBT and unrelated to treatment arm. Self-management CBT led to greater reductions in PTSD, depression, and anxiety scores at six months. One-third of those who completed self-management CBT achieved high-end state functioning at six months. The results suggest that internet-based CBT may be a way of delivering effective treatment to large numbers with unmet needs and barriers to care.

Arntz, Tiesema, & Kindt (2007) tested whether the effectiveness of imaginal exposure (IE) treatment for PTSD was enhanced by combining IE with imagery rescripting (IE+IR). The two conditions did not differ significantly in reduction of PTSD severity, although IE+IR was more effective in terms of anger, hostility and guilt, especially at follow-up. Results suggest that the addition of rescripting to IE makes the treatment more acceptable for both patients and therapists, and leads to better effects on non-fear problems like anger and guilt.

Nightmares and sleep disturbance are fundamental concerns for victims of trauma. Lamarche & De Koninck (2007) present a critical review of treatment for sleep difficulties in adults with PTSD. They conclude that CBT, including a component for nightmares (imagery rehearsal therapy) and insomnia, has been found to significantly improve sleep disturbance among these individuals. These conclusions were supported in a study by Davis & Wright (2007) which examined the efficacy of a manualized CBT for chronic nightmares in trauma-exposed individuals via a randomized clinical trial. At the six-month follow-up assessment, 84% of treated participants reported an absence of nightmares in the previous week. Significant decreases were also reported in symptoms of depression and posttraumatic stress, fear of sleep, and number of sleep problems, while sleep quality and quantity improved.

**Alternative Approaches.** In one of the few well conducted trials of an alternative therapy in PTSD, Hollifield et al., (2007) evaluated the potential efficacy and acceptability of acupuncture for PTSD. Compared with the wait-list control condition in the intent to treat model, acupuncture provided large treatment effects for PTSD, similar in magnitude to group CBT. Symptom reductions at end treatment were maintained at three-month follow-up.

## **Conclusion**

Research literature in the field of PTSD has continued to expand over recent years as our knowledge of these complex disorders continues to improve. As the preceding summary suggests, considerable emphasis is still focused on the nature and prevalence of posttraumatic mental health problems, although there is now a much greater awareness of disorders other than PTSD. Other research areas, however, such as risk factors, models, and treatment, continue to be dominated by a focus on PTSD. There is a need to expand our understanding of these areas in posttraumatic depression, anxiety and substance use disorders.

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