

Summary of the Military Mental Health and Traumatic Stress Literature: 2009

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Note

This document is a summary of some of the recent literature in the field of military and posttraumatic mental health. It was written by the Australian Centre for Posttraumatic Mental Health with the support of the Australian Government, Department of Veterans Affairs.

Disclaimer

The material in this report, including selection of articles, summaries, and interpretations is the responsibility of the consultants, the Australian Centre for Posttraumatic Mental Health, and does not necessarily reflect the views of the Australian Government.

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Executive Summary

Prevalence:

- Several review papers have highlighted the large variability in prevalence rates of PTSD and other mental health problems following deployment. A systematic review of the literature found the prevalence of PTSD for US and UK personnel deployed in Iraq varied between 1.4% and 31%. The differences in prevalence rates are best explained by methodological (and possibly cross cultural) issues. Rigorous studies point to a rate of PTSD of between 10%-17%.
- Deployment is associated with a significant increase in risk of PTSD. UK and US reservists who are deployed are particularly vulnerable in comparison to non-deployed reservists.
- Alcohol abuse is the most common mental health disorder following deployment to Iraq in UK soldiers.
- In the US, Army and Marine Corps were more than twice as likely to screen positive for PTSD compared to Navy veterans.

Vulnerability and Protective Factors:

- Environmental stressors have a direct impact on the development of PTSD symptoms following a critical incident. Specifically, supportive and cohesive work environments protect against the development of PTSD independent of other known risk factors such as age, gender, prior trauma, etc.
- Injury increases risk to PTSD in veterans as does killing during combat. Killing in combat is also associated with dissociation, functional impairment and violent behaviours.

Gender:

- While female gender is a known risk factor in the development of PTSD, the level of emotional distress that occurs during trauma may influence this relationship. It may be that police and military females have lower levels of PTSD

after trauma than their civilian counterparts because their training results in lower levels of emotional distress during trauma.

- When PTSD does develop in females, it contributes to poor physical health and increased medical morbidity.
- PTSD reexperiencing symptoms are also associated with increased risk in subsequent exposure to interpersonal trauma by a nonintimate perpetrator, in females.

PTSD, Veterans and Suicide:

- A clear link has been shown between PTSD and suicidal thoughts and behaviours, irrespective of the type of trauma. The presence of co-morbid depression boosts the effect of PTSD on suicidality.
- In US Iraq and Afghanistan war veterans, those with PTSD are 4 times more likely to report suicidal ideation relative to non PTSD veterans. If they screen for PTSD and comorbid disorders, the risk for suicidal ideation is nearly 6 times greater relative to veterans with PTSD only.
- However, in the US VA, the odds of completed suicide decreased amongst veterans with PTSD, which may be related to higher levels of mental health service provided to PTSD patients in the VA.
- Although US female veterans are less likely than male veterans to complete suicide, the rates of female suicide mortality in veterans are significantly higher than in the general population.
- Younger veterans (male and female) are at greater risk for completed suicide than older veterans.

PTSD Treatment:

- Cognitive behavioural therapy (CBT) for adult anxiety disorders performed well when tested in typical clinical settings relative to expert research settings. This provides preliminary evidence that evidence based treatments can be effectively delivered by service delivery organisations in the community.
- There remains a recognition, however, that a significant proportion of patients do not respond to treatment, with some papers calling for more sophisticated use of pharmacological interventions to augment psychological therapy. Family functioning predicts PTSD symptoms, especially avoidance, following treatment. Incorporating family systems into treatment programs may improve outcomes.

Barriers to Care:

- Barriers to treatment seeking in returning soldiers include career concerns, lack of confidence in the skills of mental health professionals, previous poor

experiences, concerns about civilian providers' ability to relate to the deployment experience, and privacy/confidentiality issues.

- Practical access barriers include difficulty getting to the location, availability of hours, and spending an excessive amount of time on paperwork.
- Although active duty females are more likely to receive mental health treatment than males, younger female US veterans were less likely to use veteran mental health services relative to males, suggesting an age/gender interaction.
- Veteran barriers included embarrassment, being perceived as weak, not knowing where to get help, and having difficulty scheduling an appointment.

Technological Advances:

- In attempt to overcome barriers to care, more research is exploring the use of technology, with particular emphasis on tele-mental health services. Tele-mental health was associated with less cancelled appointments, and less no-shows. Acceptability was found to be high especially around saving of time and travel.
- Several randomised controlled trials are currently underway exploring the treatment of PTSD and depression via video-conferencing using veteran samples.

Veterans and their Family:

- Research is conflicting regarding the extent and nature of problems experienced by partners and families of people with PTSD: rates of depression, anxiety and relationship distress among civilians are relatively low, but appear to be higher among veteran populations.
- Most younger veterans with mental health problems report current relationship problems with family. Partners of veterans with PTSD have a high burden of care and support groups have been found to be helpful.
- Other models of intervention such as a multifamily group model are currently being trialled.

Physical Health and Veterans:

- Fourteen years after deployment, US Gulf War veterans reported significantly higher rates of multi-symptom illness, chronic fatigue syndrome-like illness, PTSD, functional impairment, health care utilisation, a majority of selected physical conditions and all mental disorders surveyed, in comparison to military peers who were not deployed to the Gulf.
- In Australian Vietnam veterans, army service and war-related PTSD are associated with risk of illness in later life.

- Deployment with multiple stressful combat exposures appears to be a unique risk factor for newly reported hypertension, with similar cardiovascular outcomes reported following high stress work in civilians.
- Veterans deployed to conflict zones are more likely than non conflict veterans to be killed through injury such as motor vehicle accidents, particularly in the early years following deployment.

Traumatic Brain Injury (TBI):

- MTBI is being claimed as the 'signature' injury of the Iraq war and is believed to be the cause of long-term symptomatic ill-health (i.e., post concussional syndrome or PCS) in an unknown proportion of US military personnel.
- Research shows that PCS symptoms are not specifically related to head injury only, but also to a number of non-clinical factors and potentially distressing exposures which have no link to head injury.
- A systemwide TBI screening, along with a set of management guidelines, has been implemented by the US VA. A key component of these guidelines has been incorporation of education emphasising expectations of recovery.
- In US veterans with MTBI and PTSD, PTSD mediated the relationship between MTBI and poor health outcomes. Furthermore, veterans who screened positive for MTBI had high rates of PTSD.
- There is some evidence to suggest that veterans with MTBI recover more slowly from PTSD than those without.

Rehabilitation and Injury:

- Community reintegration is challenging for injured veterans because the physical injuries often co-occur with mental health difficulties such as PTSD, depression and substance abuse.
- A veteran specific measure of community reintegration- the 'Community Reintegration for Service members (CRIS)- has been developed and validated.
- Although data are conflicting, it does appear that serious physical injury in deployed personnel increases risk of PTSD.

Australian Centre for Posttraumatic Mental Health

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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 2009. The review is an informed review not a critical review. We strongly recommend that readers source the original papers if they are interested in a particular finding.

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.

Prevalence

The year 2009 saw a number of studies examining the prevalence of PTSD and other mental health conditions after combat. In a sample of UK and US personnel who deployed to Iraq, the prevalence of PTSD symptoms was found to be 4.8%, and the most common disorder was alcohol abuse (18%) (Iversen et al., 2009). UK and US reservists who deployed to Iraq and other recent deployments were at increased risk of PTSD compared to reservists who did not deploy. The prevalence of PTSD symptoms, depression and subjective poor health were similar between regular UK and US Iraq combatants. A systematic review of the literature found the prevalence of PTSD deployed in Iraq varied between 1.4% and 31% (Sundin, Fear, Iversen, Rona, & Wessely, 2010)¹. In contrast to Iversen (2009), it was found that UK studies tend to report a low prevalence of PTSD compared with many US studies; however, when comparisons are restricted to studies with random samples, prevalences were similar.

In a review of the prevalence of PTSD across war eras (Magruder & Yeager, 2009), deployment was found to lead to a significant increase in risk of PTSD. The odds of PTSD for deployed versus non-deployed veterans were greatest for those who served in Vietnam. Reasons for this may include the high exposure rates in Vietnam, or the poor homecoming reception that was experienced by Vietnam veterans relative to that experienced by OIF/OEF (Operation Iraqi Freedom and Operation Enduring Freedom) and PGW (Persian Gulf War) veterans. Another explanation may be that more recent studies have been of higher quality, with this contributing to more precise prevalence estimates (Magruder & Yeager, 2009). Finally, the DSM criteria for PTSD has changed over time, and some of the Vietnam studies used earlier DSM criteria while PGW and OIF/OEF studies used later criteria, which may have influenced results (Magruder & Yeager, 2009).

Significant mental health symptoms have been found in US and Canadian service members returning from OIF/OEF (e.g. Hoge et al., 2004; Sareen et al., 2007). A more recent examination of US OIF/OEF veterans found that only a minority did not screen positive for mental health symptoms (36%) with the remaining 64% meeting caseness for PTSD, depression, and substance abuse and alcohol abuse (Baker et al., 2009). These results should be treated with caution, however, due to the fact that brief screening measures were used to identify caseness rather than comprehensive clinical assessments. In addition, this study involved a very small sample (i.e. n= 339), in comparison to other well cited studies such as that of Hoge (2004). Compared with Navy veterans, members of the Army and Marine Corps were more than twice as likely to screen positive for PTSD. Report of injury during combat was also significantly related to PTSD caseness. The caseness rates that were found in this study are higher than those found in many other studies (e.g. Hoge et al., 2004; Milliken, Auchterlonie, & Hoge, 2007; Seal, Bertenthal, Miner, Sen, & Marmar, 2007), which could be due to the fact that this study used brief screening measures to identify caseness, whereas many other studies use clinical diagnoses.

¹ This article was published in hard copy in 2010, but was published online in 2009. Due to its direct relevance and significance, it was included in the 2009 annual review.

Vulnerability and Protective Factors

Identifying risk and protective factors helps in understanding why mental health disorders develop following trauma. They provide potential ways to mitigate against trauma related psychopathology.

Recent research has shown that the routine work environment of police officers is more strongly associated with PTSD symptoms, than gender, ethnicity, traumatic exposure prior to entering the academy, current negative life events and critical incident exposure over the last year (Maguen, Metzler, McCaslin et al., 2009). Routine work environment stress mediates the relationship between critical incident exposure and PTSD symptoms and between current negative life events and PTSD symptoms (Maguen, Metzler, McCaslin et al., 2009). This highlights that environment stressors such as equipment not working, daily operational hassles, being unclear about work roles, stressful relationships with co-workers, and feelings of discrimination have a direct impact on PTSD symptoms. It is hypothesised that compassionate, supportive work environments can help to protect employees against the development of duty-related PTSD (Maguen, Metzler, McCaslin et al., 2009).

Many US neuroimaging studies have been conducted in the past to find biological explanations for PTSD, and these studies have found functional abnormalities in several brain regions including the anterior cingulate cortex (e.g. Shin et al., 2005; Williams et al., 2006). Neurological vulnerabilities have been explored through the comparison of combat exposed veterans with PTSD and their identical co-twin, and combat exposed veterans without PTSD and their identical co-twin (Shin et al., 2009). Veterans with PTSD and their co-twins were found to have significantly higher resting activity in the dorsal anterior cingulate cortex/midcingulate cortex, indicating a familial risk for developing PTSD following exposure to trauma (Shin et al., 2009).

Sleep disturbance in veterans with PTSD is an area that has received considerable attention in the past (e.g. Harvey, Jones, & Schmidt, 2003; Lamarche & De Koninck, 2007). Furthering the existing literature, an examination of both veterans with PTSD and veterans without PTSD indicated that serious sleep problems are common across the veteran population, with factors associated with the military experience contributing to poor sleep (Lewis, Creamer, & Failla, 2009).

Modern wars that include close-range combat in urban environments are associated with a high probability of military personnel taking another life (Maguen, Metzler, Litz et al., 2009). Little is known about the specific mental health and functional consequences associated with killing combatants and non-combatants. Using pre-existing data (the National Vietnam Veterans Readjustment Study; Kulka et al., 1990), and controlling for demographic variables and exposure to general combat experience, killing has been found to be associated with PTSD symptoms, dissociation, functional impairment and violent behaviours (Maguen, Metzler, Litz et al., 2009). Prior studies have found PTSD to be associated with violent behaviour in veterans. By increasing awareness of the need to assess for killing behaviours,

clinicians can more easily ask about subsequent violent behaviours and implement programs.

Gender

Studies of civilian populations typically find that female gender is a risk factor for PTSD (see Tolin & Foa, 2006). Often, however, police and military studies do not find gender differences for PTSD (Pole et al., 2001; Sutker, Davis, Uddo, & Ditta, 1995). Comparison of female police officers and female civilians (Lilly, Pole, Best, Metzler, & Marmar, 2009), has found that despite greater exposure to assaultive violence in the police group, female civilians report significantly more severe PTSD symptoms. Elevated PTSD symptoms in female civilians have been explained by more intense peritraumatic emotional distress among female civilians. Female police show a stronger direct relationship between peritraumatic emotional distress and current somatisation (Lilly et al., 2009). Apparent gender differences may result from differences in peritraumatic emotionality, which influence subsequent PTSD and somatisation symptoms (Lilly et al., 2009). It is warranted that future research investigate the influence of emotionality on symptomatology, rather than solely focusing on gender differences.

The current wars in Iraq and Afghanistan have led to an increasing number of female veterans seeking medical and mental healthcare. Amongst OIF/OEF veterans (both male and female) 20.6% reported persistent pain (Haskell et al., 2009). Female OIF/OEF veterans are less likely to report any pain, but among those with any pain, females are more likely to report moderate-severe pain (Haskell et al., 2009). In the future, providers need to work on the continued improvement of services for female veterans and trial innovative means of delivering services to female veterans.

It is well established that PTSD is generally associated with poor health, medical morbidity and increased health service utilisation (for review see Schnurr & Green, 2003). Extending previous work, recent research has shown that PTSD, with or without major depression is associated with poor health in women with mixed trauma histories (Calhoun, Wiley, Dennis, & Beckham, 2009). PTSD severity is related to health complaints beyond the effects of both somatisation and depression symptoms among women with PTSD. The relationship between PTSD and health complaints is not simply accounted for by the high comorbidity between PTSD and major depression (Calhoun et al., 2009).

Previous research has suggested that both exposure to traumatic events and the emotional consequences of surviving trauma (e.g. drug use and depression) are risk factors for subsequent trauma exposure (e.g. Breslau, Davis, Peterson, & Schultz, 1997; Testa, VanZile-Tamsen, & Livingston, 2007). Research to date, however, suffers from a number of limitations including the use of cross-sectional designs and student populations. Addressing a number of these limitations, Coughle, Resnick and Kilpatrick (2009) used a 2-year prospective design to assess risk factors for subsequent exposure to traumatic events among women. After controlling for demographic characteristics, prior exposure to traumatic events and initial assessment depression and substance abuse, PTSD reexperiencing symptoms at initial assessment predicted subsequent exposure to interpersonal trauma by a

nonintimate perpetrator. These results indicate that trauma history is important to ascertain when identifying women at high risk for subsequent trauma, and women reporting these risk factors may benefit from interventions designed to increase skills for use in potentially dangerous interpersonal situations (Cogle et al., 2009).

PTSD, Veterans and Suicide

Suicide is a leading cause of death world-wide, and is included in the ten leading causes of death across different age groups (Bertolote & Fleischmann, 2005). Although there have been significant advances in suicide research, there remains a need for research aimed at better understanding the risk factors for suicide and nonfatal suicide behaviour in veterans. Nonfatal suicide behaviours are among the most significant predictors for subsequent suicide deaths. Large scale cross-national analysis (Nock et al., 2009) has found that Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) lifetime disorders (i.e. anxiety disorders, mood disorders, impulse-control disorders, and substance use disorders), increase the odds of experiencing suicide ideation. After controlling for psychiatric comorbidity, however, only disorders characterised by anxiety and poor-impulse control predicted which people with suicide ideation act on such thoughts (Nock et al., 2009).

A review of 65 studies related to the risk factors and mechanisms of suicidal thoughts and behaviours in a mixture of populations, found a clear link between PTSD and suicidal thoughts and behaviours, irrespective of the type of trauma (Panagioti, Gooding, & Tarrier, 2009). The presence of co-morbid depression boosts the effect of PTSD on suicidality. For US Iraq and Afghanistan war veterans, the risk of suicidal ideation for those who screen positive for PTSD is 4 times greater than for non-PTSD veterans (Jakupcak et al., 2009). Among US veterans who screen positive for PTSD and who also screen positive for two or more co-morbid disorders, the risk for suicidal ideation is 5.7 times greater relative to veterans with PTSD only (Jakupcak et al., 2009).

There has been considerable research investigating the relationship between depressive disorders and suicide risk, however, less is known about the contribution of anxiety symptoms to the risk of suicide death among depressed patients. Within the general population, between 2 and 8% of depressed patients eventually die from suicide (Bostwick & Pankratz, 2000; Inskip, Harris, & Barraclough, 1998). When demographics and substance use disorders are controlled for the odds of completed suicide are significantly greater for US veterans with panic disorder, generalised anxiety disorder, and anxiety disorder not otherwise specified (Pfeiffer, Ganoczy, Ilgen, Zivin, & Valenstein, 2009). The odds of completed suicide are greater among US veterans receiving anti-anxiety medication, and are further increased among those who received high dose treatment (Pfeiffer et al., 2009). The odds of completed suicide decreases amongst veterans with comorbid PTSD (Pfeiffer et al., 2009). This finding may be related to the higher levels of mental health services and income supports provided to patients with depression and PTSD in the US VA (Pfeiffer et al., 2009).

Examination of suicide rates among VA patients in comparison to the rates of the general population (for the fiscal years 2000-2001, prior to conflicts in Afghanistan and Iraq) has shown that VA patients have higher suicide rates than the general population (McCarthy et al., 2009). Crude rates among female VA patients for this period are substantially lower than among male patients, however, compared to females in the general population VA female patients have high suicide mortality (McCarthy et al., 2009).

Across age groups male and female veterans have higher firearm suicide rates than nonveterans (Kaplan, McFarland, & Huguet, 2009). Younger veterans (18-34 years) have both the highest firearm and total suicide rates (Kaplan et al., 2009). Although violent death and the use of firearms are usually associated with men, firearms among female veterans deserve particular attention among health professionals working with veterans (Kaplan et al., 2009). There is also a need for further study of how PTSD fits into an overall risk assessment, and providers of services to veterans must also address suicide risks among both male and female patients.

PTSD Treatment

The efficacy of Cognitive Behavioural Therapy (CBT) for anxiety in adults has been well established (for review see Deacon & Abramowitz, 2004; Norton & Price, 2007). A meta-analysis of effectiveness studies by Stewart and Chambless (2009) examined whether CBT tested under well controlled conditions generalises to less-controlled, real world circumstances. Benchmarking indicated that results from effectiveness studies were in the range of those obtained in selected efficacy trials. These results provide evidence for the generalisability of CBT for adult anxiety disorders from highly controlled research setting to typical clinical settings (Stewart & Chambless, 2009).

Dissemination of evidence-based treatments for PTSD is a high priority need for all mental health training and service delivery organisations. A review article by Ruzek and Rosen (2009) critically evaluated the PTSD-related research and emerging theory related to four major sets of variables that affect dissemination: (1) practitioner factors, (2) training methods, (3) the practice innovation(s) being disseminated, and (4) organisation or system factors. Five broad topics with particular implications for dissemination of PTSD-specific treatment were considered: (1) the content of dissemination (i.e., which treatment protocols or intervention methods should be prioritised); (2) strict adherence versus flexibility in the use of treatment manuals; (3) the need for collaboration with user audiences; (4) the potential role of web-based technologies in increasing the effectiveness and efficacy of dissemination; and (5) development of dissemination infrastructures within organisations. Ruzek and Rosen conclude that as the “evolution of services moves forward, effective dissemination should be a major focus of health policy research for the next decade or more” (2009, p. 987)

A proportion of subjects with symptoms of PTSD are unresponsive to specialised psychotherapy. Differences in cortisol or its metabolites have been hypothesised to correlate with response to therapy for PTSD (Yehuda et al., 2009). Differences in urinary cortisol parameters over time were demonstrated in treatment seeking

participants who were deemed non-responders to psychotherapy for PTSD compared to those who showed full recovery (Yehuda et al., 2009). Cortisol levels may continue to decline as PTSD becomes more chronic or treatment-resistant, meaning cortisol treatment may be effective in alleviating symptoms of PTSD (as demonstrated by Aerni et al., 2004), or even in preventing the onset of the disorder (see Schelling et al., 2006). This is an area that requires significantly more research.

A recent review of the empirical evidence on the treatment of acute and chronic PTSD led to the conclusion that “progress made in understanding the therapy of PTSD has already shown a ceiling effect of pharmacotherapy and psychological therapies. At present many PTSD patients continue to suffer despite treatment. Moreover, effective psychotherapies for PTSD require resources that are not available in most places. Studies of more sophisticated pharmacotherapies (e.g., via augmentation of association with psychological therapies) are badly missing” (Shalev, 2009, p. 697), therefore future research must explore this area.

The interaction between trauma and family functioning is known to be bidirectional with family functioning sometimes alleviating the impact of trauma on the individual, but in other cases the stress of the individual transmits and affects other family members (Figley, 1993). Family functioning has been found to be a moderate predictor of PTSD symptoms post-treatment and at 6-month follow-up (Evans, Cowlshaw, & Hopwood, 2009). The avoidance cluster of PTSD symptoms is most strongly related to family functioning (Evans et al., 2009). There is potential for the further development of treatment programs, through the incorporation of family systems.

Barriers to Care

Currently, the literature lacks clear connections between self-reported mental health symptoms and service usage or barriers to care. An examination of the responses of returning US soldiers by Hoge (2004), found a high level of resistance about seeking treatment, along with increased concerns about stigma. It has been found that as the rate of self-reported mental health symptoms increases, active duty US Air Force members are less inclined to seek help (Visco, 2009). Females are more likely to receive assistance for mental health problems than males. According to qualitative data (Visco, 2009), barriers to seeking treatment include: career concerns, lack of confidence with mental health professionals in terms of varying levels of experience and previous poor experiences. In particular, many active duty Air Force members express concerns about seeking help from civilian personnel and cite “their inability to relate to the deployment experience” as a barrier. Other significant barriers include difficulty getting to the location, availability of hours, spending an excessive amount of time on paperwork, and privacy/confidentiality issues.

Similarly, for OIF/OEF US veterans, negative beliefs about mental health care, particularly psychotherapy, and decreased perceived unit support predict increased perceptions of stigma and barriers to care (Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009a). The stigma and barriers to care items most strongly associated with screening positive for a psychiatric disorder are embarrassment, being

perceived as weak, not knowing where to get help, and having difficulty scheduling an appointment. Stigma and barriers to care could be reduced by teaching soldiers and their families to understand that combat stress reactions are normal and expected responses to abnormal situations, rather than signs of psychopathology. The aforementioned studies (Pietrzak et al., 2009a; Visco, 2009) underscore the need for ample and easily accessible mental health services for veterans.

Younger women veterans (< 35 years) have been found to be significantly less likely and older women (>= 35) more likely to use any US VA mental health services in comparison with their male counterparts (for the fiscal year 1999) (Chatterjee et al., 2009). In the case of specialised services for PTSD, women younger than 55 have been found to be significantly less likely to use services than men. These findings are somewhat contradictory to those of Visco (2009), who found that female active duty Air Force members were more likely to receive assistance for mental health problems than males. A possible explanation for this difference could be the status of the women (i.e. active duty vs veterans), or other factors such as age which could influence receipt of mental health care. Examining gender differences alone, without taking other factors into account, does not provide an adequate picture of female active duty and veterans' mental health service needs (Chatterjee et al., 2009).

Technological Advances

In an attempt to overcome the barriers to care, more research is beginning to explore the range of technologies that may be used to overcome issues such as geographic location and being time poor. The provision of mental health services via tele-mental health has become an increasingly common component of mental health service delivery worldwide (e.g. Simpson, 2009), and in 2009 a number of studies utilised tele-mental technology to address mental health problems (e.g. Botella et al., 2009; Whitten, Quinlan, Nazione, & Branam, 2009; Yeung et al., 2009). High levels of satisfaction and acceptance with tele-mental health have been consistently demonstrated across a variety of clinical populations and for a broad range of services (Richardson, Frueh, Grubaugh, Egede, & Elhai, 2009). Mental health services delivered via teleconferencing generally appear to be clinically superior to reduced or no mental health services at all. However, low uptake rates by clinicians and service surveys suggest that many clinical who have not used tele-mental health remain sceptical about the feasibility about this mode of care (Austen & McGrath, 2006). Telecommunication media can be used to create new models for the treatment and management of psychiatric problems, however new conceptual frameworks and theories are needed to serve as useful guides (Mohr, 2009).

Analysis of telepsychiatry appointment data has shown that a higher proportion of telepsychiatry appointments are kept, in comparison to face-to-face appointments (92% telepsychiatry vs 87% non-telepsychiatry) (Leigh, Cruz, & Mallios, 2009). Telepsychiatry appointments are significantly less likely to be cancelled by patients (3.5% vs 4.8%) and significantly less likely to be no-shows (4.2% vs 7.8%) (Leigh et al., 2009). Similarly, the acceptability of videophones for intensive case management of psychiatric patients has been found to be high, with 74% of patients satisfied with their treatment (Nieves, Godleski, Stack, & Zinanni, 2009). Specific areas of satisfaction concern the savings of time and travel, assistance with medication

questions and increased involvement in treatment. Staff members have been found to be enthusiastic about the decrease in travel time, and this decrease can result in significant cost savings (Nieves et al., 2009). This technology could also have potential uses for helping patients to transition to community life (Nieves et al., 2009).

Internet and computer based treatments for anxiety disorders have been found to have effects that are equal to therapist delivered treatment (Reger & Gahm, 2009). However there are limitations associated with the currently available studies, therefore well-designed placebo-controlled trials are needed in this area (Reger & Gahm, 2009). Partly addressing this need, in 2010, Egede and colleagues (2009) will begin a four-year prospective randomised clinical trial of the effectiveness of the behavioural activation treatment for depression, delivered via either videoconferencing or face-to-face sessions. In relation to PTSD, a randomised clinical trial of cognitive processing therapy (CPT) delivered either via video teleconferencing, or by face-to-face sessions, is about to be conducted by Morland, Greene, Rosen, Mauldin and Freuh (2009). Returning veterans with current combat related PTSD who were receiving services through the VA will be assigned to one of the two conditions, and efficacy will be assessed. Additionally a cost analysis of the two modalities will be performed.

Technologies such as videoconferencing and teleconferencing have enormous potential to overcome the significant difficulties created by veterans who reside in rural locations. This technology will enable evidence-based treatments to be provided to military populations, regardless of location. In addition, this technology can also be used for case management, and help returning veterans transition back into civilian life.

Veterans and their Family

Significant others of individuals with PTSD may experience both intrapersonal and interpersonal distress as caregivers (Chartier-Otis, Guay, & Marchand, 2009). Although psychological and relationship distress among partners of civilians with PTSD is portrayed as being somewhat common, only a minority of partners present with clinical levels of depression (16.7%), anxiety (14.8%) and relationship distress (37%) (Chartier-Otis et al., 2009). Partners' distress and PTSD patients' symptoms have been found to have no significant association, which contradicts the secondary traumatic stress hypothesis (Chartier-Otis et al., 2009). As such, it may be preferable to routinely only offer supportive interventions to partners, since most of them are not highly distressed.

In qualitative research, emotional numbing and anger have emerged as major themes that negatively impacts familial relationships; and emotional withdrawal from family support creates difficulties with healing from trauma (Ray & Vanstone, 2009). PTSD treatment may benefit from including support of the family and interpersonal skills training for military personnel suffering from PTSD (Ray & Vanstone, 2009).

In the past 12 months, a review of the impact of deployment upon children and their families was conducted by McFarlane (2009). He concludes that currently

intervention programs are described, however there is a poverty of evaluation studies. McFarlane (2009) states that a substantial advantage of focusing on family adjustment is that it can facilitate access to mental healthcare for veterans while assisting families' positive adaptation.

Further qualitative analysis has shown that the impact of living with a partner with war-related PTSD appears to be significant and ongoing with women drawing parallels to living in a war zone (Outram, Hansen, MacDonell, Cockburn, & Adams, 2009). The biggest negative impact is on mental health, with women feeling burdened as carers and struggling to find explanations for their husbands' problems. Women have stated that they consider support groups very helpful (Outram et al., 2009). Interestingly, a needs analysis of partners of Vietnam veterans with PTSD found that the most commonly requested service was a women-only group (Sherman et al., 2005).

For returning veterans who served in Iraq or Afghanistan after 2001 and who were referred for behavioural health evaluation, it has been found that three quarters of the married/cohabiting veterans reported some type of family problem in the past week, such as feeling like a guest in their own house (40.7%), reporting their children acting afraid or not being warm to toward them (25%) or being unsure about their family role (37.2%) (Sayers, Farrow, Ross, & Oslin, 2009). Among veterans with current or recently separated partners, 53.7% reported conflicts involving "shouting, pushing or shoving", and 27.6% reported that their partner was "afraid" of them. Depression and PTSD were both associated with higher rates of family reintegration problems. These findings suggest there is an opportunity to improve the treatment of psychiatric disorders by addressing family problems.

A description of an adaptation of the multifamily group model and its implementation with veterans living with PTSD is provided by Sherman and colleagues (2009). Named the REACH program (Reaching out to Educate and Assist Caring, Healthy Families), the program begins with 4 weekly "joining sessions" where the individual veteran and his/her family focus on rapport building, assessment and goal setting (Phase 1). Next, veterans and their families attend 6 weekly diagnosis-specific educational/ support sessions, which are conducted in a group context (groups of 4 to 6 veterans and their families; Phase II). Finally, veterans and their families attend 6 monthly multifamily groups to support the maintenance of gains (Phase III). Participants from the PTSD and affective disorders diagnostic cohorts reported positive satisfaction during Year 1 of the REACH program, and there were also high within-phase retention rates (Sherman et al., 2009).

Physical Health and Veterans

Numerous health studies have identified a constellation of symptoms and medical conditions associated with Gulf War service (e.g. Kang, Mahan, Lee, Magee, & Murphy, 2000; National Institutes of Health Technology Assessment Workshop Panel, 1994; The Iowa Persian Gulf Study Group, 1997), however only a few studies have longitudinally followed Gulf War veterans to evaluate the long term consequences of deployment (i.e. Hotopf et al., 2003, 2004; Ozakinci, Hallman, & Kipen, 2006). A recent follow-up health survey of 30,000 veterans found that 1991

Gulf War veterans had significantly higher rates of multi-symptom illness, chronic fatigue syndrome-like illness, PTSD, functional impairment, health care utilisation, a majority of selected physical conditions and all mental disorders surveyed, in comparison to military peers who were not deployed to the Gulf (Kang, Li, Mahan, Eisen, & Engel, 2009). These results show that fourteen years after deployment Gulf War veterans continue to report a higher prevalence of many adverse health outcomes, compared with Gulf era veterans.

Three decades after the war in Vietnam, Australian veterans general health and some health risk factors are poorer and medical consultation rates are higher than Australian population expectations (O'Toole, Catts, Outram, Pierse, & Cockburn, 2009). Half of all veterans take some form of medication for mental well-being and that the prevalence of psychiatric diagnoses exceeded Australian population expectations (O'Toole et al., 2009). Military and war service characteristics and age are most frequent predictors of physical health endpoints, while PTSD is most strongly associated with psychiatric diagnoses. Army service and war-related PTSD are associated with risk of illness in later life among Australian veterans (O'Toole et al., 2009).

Stress related to high-pressure work, natural disasters and missile attacks has been associated with increased myocardial infarction and other cardiovascular risk (Tofler & Muller, 2006). Military deployers in general, have been found to have a lower incidence of hypertension than non-deployers, but deployment with multiple stressful combat exposures, especially witnessing a death because of war or disaster, appears to be a unique risk factor for newly reported hypertension (Granado et al., 2009). Research in this area has tended to rely on self-report measures, therefore future studies evaluating military deployment and hypertension diagnosis through blood pressure measurements are recommended.

Retrospective cross-sectional analysis of VA administrative and Medicare fee-for-service (FFS) claims data for elderly diabetic veterans (65 years or older), has shown that almost half the sample were overweight (47.6%), followed by obese (22.6%), normal (20.7%) and morbidly obese (9.1%) (Shen et al., 2009). Elderly diabetes patients with normal weight incurred much higher costs than obese or morbidly obese patients. While this result may seem counter-intuitive, it has been speculated that elderly patients who are obese may have better outcomes than those with a normal BMI (Shen et al., 2009). Further research is needed to examine the causes of this phenomenon to better understand resource needs and to improve resource allocations (Shen et al., 2009).

To prepare for military missions, military personnel must achieve and maintain high levels of fitness (Littman, Forsberg, & Koepsell, 2009). However, despite the high level of physical activity required of active duty military personnel, only a minority of veterans have been found to meet physical activity recommendations, and the prevalence of inactivity is particularly high in VA users (Littman et al., 2009). These findings suggest a large potential to increase physical activity and improve health in VA users.

A systematic review of the literature on post-conflict injury-related mortality of service members who deployed to conflict zones found that compared with non-conflict zone veterans, injury-related mortality is elevated for veterans serving in Vietnam (Knapik,

Marin, Grier, & Jones, 2009). Similarly, injury-related mortality is elevated for veterans serving in the Persian Gulf War during 3 to 8 years of follow-up. Much of the excess mortality is associated with motor vehicle accidents, and the excess mortality decreases over time. Reasons postulated for excess mortality include PTSD, coping behaviours such as substance abuse, ill-defined diseases and symptoms, lower survivability in injury events due to conflict-zone comorbidities, altered perceptions of risk, and/or selection processes leading to the deployment of individuals who were risk takers (Knapik et al., 2009). Future research on the etiology of the excess mortality in conflict zone veterans is warranted to develop appropriate interventions.

Depression and anxiety frequently co-occur with pain and may affect treatment outcomes. US VA patients with moderate-severe pain are at high risk for psychological distress, which often goes unrecognised (Sherbourne et al., 2009). Providers need to be vigilant to mental health problems in patients experiencing high levels of pain, and should consider targeted screening for co-occurring conditions (Sherbourne et al., 2009).

Generalised anxiety disorder and major depression have been found to predict all-cause mortality in veterans, after adjusting for a range of covariates. However, those with both generalised anxiety disorder and major depression are at greatest risk of subsequent death, and it would seem that these disorders interact synergistically to affect mortality (Phillips et al., 2009).

A cross-sectional analysis (of the fiscal years 1999 and 2000) among veteran women with diabetes found 45% had a mental illness, substance use disorder, or both (Banerjea, Pogach, Smelson, & Sambamoorthi, 2009). Substance use disorder was high among those with serious mental illness. High rates of mental illness and substance use disorder suggest that care for mental and physical illness needs to be integrated into health care planning and delivery of services to veteran women with diabetes.

Traumatic Brain Injury (TBI)

In the Australian population, approximately 15,000 people experience a mild traumatic brain injury (MTBI) per year (Rees, 2005). Although most fully recover, problems persist in 15% to 25% of cases (Gronwall & Wrightson, 1981; Ponsford, Willmott, Rothwell, & al., 2000). PTSD and ASD have both been shown to develop after MTBI (Carty, O'Donnell, & Creamer, 2006; Creamer, O'Donnell, & Pattison, 2005). Following traumatic injury, there is a trend towards higher levels of ASD for those who meet criteria for MTBI compared to those without a MTBI (Broomhall et al., 2009). Those with a MTBI and ASD have been shown to have longer hospital admissions and higher levels of distress associated with their symptoms. Although many of the ASD symptoms that those with a MTBI have been found to score significantly higher for are also part of a postconcussive syndrome, higher levels of avoidance suggest that those with a MTBI are at risk for longer term poor psychological adjustment after traumatic injury (Broomhall et al., 2009).

MTBI is being claimed as the 'signature' injury of the Iraq war and is believed to be the cause of long-term symptomatic ill-health (i.e. post concussional syndrome) in an unknown proportion of military personnel (Fear et al., 2009). Postconcussional symptoms are common and some are related to exposures such as blast injury. However, this association is not specific and the same symptom complex is also related to numerous other risk factors and exposures. Postconcussive syndrome symptoms have been found to be not specifically related to head injury only, but also to a number of non-clinical factors and potentially distressing exposures which have no plausible link to head injury (Fear et al., 2009). Those with postconcussive syndrome symptoms are also more likely to report psychological distress, raising the issue of whether postconcussive syndrome symptoms are part of the complex expression of psychological distress (Fear et al., 2009).

The Polytrauma System of Care (within the US VA) has been designed to provide access to lifelong rehabilitation for veterans and active duty service members recovering from polytrauma and MTBI (Belanger, Uomoto, & Vanderploeg, 2009). Patients identified through the system receive ongoing case management beginning at the military treatment facility and continuing through the VHO hospitalisation or outpatient care and on return home. This case management is conducted by both nurses for clinical case management and social workers for psychosocial case management. As patients transition to the next phase of care, personal communication is made between the teams, often using videoconferencing. Videoconferencing is used to facilitate discharge, coordinate care and for evaluation of treatment planning. It gives providers, patients and families the opportunity to "meet" one another, communicate and anticipate future needs.

The US Department of Defense has implemented screening processes throughout the course of combat operations. If a service member is exposed to a significant blast or other traumatic event, they are immediately screened to determine if an alteration of consciousness occurred (Jaffee & Meyer, 2009). If so, further cognitive evaluation is performed using the Military Acute Concussion Evaluation (MACE). Those diagnosed with concussion through this process are managed locally where possible and referred to higher echelon centres for management of complex or persistent symptoms (Jaffee & Meyer, 2009). Combat stress counselling may also be initiated as psychological stressors may impact cognitive performance and symptom reporting.

A systemwide TBI clinical reminder is now completed if a veteran served in Iraq or Afghanistan after 2001 and if he/she has not already been identified as having a TBI (Belanger et al., 2009). It consists of 4 questions: (1) Did you have any injury(ies) during your deployment from any of the following? (check all that apply: fragment, bullet, explosion, etc), (2) Did any injury you received while deployed result in any of the following? (check all that apply: being dazed, confused or "seeing stars," not remembering the injury, losing consciousness, head injury, etc), (3) Did any of these begin or get worse afterward? (check all that apply: dizziness, headaches, memory problems, balance problems, ringing in the ears, irritability, sleep problems), and (4) In the past week, have you had any of the above symptoms? (check all that apply: dizziness, memory problems, etc). A positive response to *all* 4 questions constitutes a positive screen. Positive screens automatically generate a consult to a TBI

specialist or specialty clinic if the veteran agrees to further assessment or care (Belanger et al., 2009).

Although implementation of standardised care that includes systemwide screening, diagnosis-specific templates, and practice guidelines have been shown to improve outcomes (Lesho, Myers, Ott, Winslow, & Brown, 2005), there are many barriers that must be overcome in implementation and follow-through. Logistical problems include follow-up after a positive screen, which typically means returning to the medical centre at a later date. This can be challenging in a younger veteran population, many of whom are working, live significant distances from the specialty polytrauma/TBI program, and have difficulty attending appointments during the day (Belanger et al., 2009). There is also the issue of having properly trained staff available for screening and follow-up with such a large number of patients. Concerns have been expressed about the TBI clinical reminder screening itself (Hoge et al., 2008), due to the fact that the VA's TBI clinical reminder has unknown reliability and validity. The TBI clinical reminder screens for current or persisting symptoms. These symptoms may be due to a residual postconcussion syndrome (PCS) related to a MTBI, but false positive errors occur if current symptoms are due to other postdeployment conditions such as PTSD, depression, substance abuse, chronic sleep disorder, and/or chronic pain (Belanger et al., 2009).

An expressed goal of the VA screening was to be over-inclusive, however this has raised some concerns. It has been noted that although the VA TBI screen decreases the likelihood that a service member with MTBI will "fall through the cracks", over identification will increase the number of service members who need detailed follow-up assessments to evaluate possible residual effects from a brain injury and this increase the resources needed to conduct post-deployment assessments (Iverson, Langlois, McCrea, & Kelly, 2009). Screening itself may also have adverse consequences for some service members, associated with misattribution of symptoms to "brain injury" versus other possible aetiologies (Iverson et al., 2009). Finally it complicates surveillance and results in the potential for inaccurate reporting. However, an often-overlooked *benefit* of including false positives is that symptomatic patients are identified and can be referred for appropriate care (Iverson et al., 2009).

Initial screening estimates of the number of service members who sustained an MTBI do not accurately represent either (a) the number of service members who were actually injured (due to false negatives and false positives), or (b) the number of service members who have ongoing problems resulting from the injury (Iverson et al., 2009). Follow-up assessment to confirm the experience of an MTBI remains challenging because it is based on self-report of the circumstances of an injury event that may have occurred many months earlier, and there are well-known problems of recall bias in symptomatic populations (Wessely, 2003). Extrapolating from the literature (Belanger, Curtiss, Demery, Lebowitz, & Vanderploeg, 2005; Belanger & Vanderploeg, 2005) it is likely that most service members who sustain an MTBI during deployment will have recovered fully, or nearly fully, from a cognitive perspective by the time of the post-deployment screening (Iverson et al., 2009). Therefore the diagnosis of MTBI indicates only the history of injury and does not define the functional outcome or current symptoms (Iverson et al., 2009). Additional research is needed in this area to refine the screening methodology and minimise false positives.

TBI and Treatment

Military personnel returning with TBI often have additional physical and mental health comorbidities. There is a small but growing literature addressing the needs of families when a family member has sustained a TBI. Adapting family focused therapy for those with moderate to severe TBI is a notion that is gaining some popularity (Dausch & Saliman, 2009). Focusing on both individual and family functioning is a useful starting point, however further research is needed to establish the feasibility of this approach (Dausch & Saliman, 2009).

There is a need for more occupational therapists to provide evidence-based rehabilitation to service members who sustained MTBI while deployed (Radomski, Davidson, Voydetich, & Erickson, 2009). By using evidence-informed and holistic services, occupational therapists have the potential to lead rehabilitation and reintegration efforts for service members with MTBI (Radomski et al., 2009).

TBI and PTSD

A significant number of military personnel returning from Iraq and Afghanistan have TBI and PTSD. The combination of TBI and PTSD presents an array of challenges for the injured person. Burke, Degeneffe and Olney (2009) discuss the need to develop and facilitate specialised care and rehabilitation. Neurobiological, behavioural and physiological characteristics associated with combat related TBI/PTSD injuries are highlighted. In relation to those who have TBI/PTSD, a number of research and practical recommendations are proposed including: increase research concerning neurobiological, psychological and physical health implications; research employment outcomes; clinical considerations, including assistive technology such as videoconferencing; bureaucratic/systemic improvements; examination of impact on family; advocacy within criminal justice system; screening improvements; expanded treatment options, including computer technology; networking among service providers; increased community outreach - increasing awareness to the barriers to transition is encouraged to accentuate the need for additional resources, services and research; ongoing learning- professionals need to stay informed about ongoing research and developments.

The challenges related to assessment and intervention for those with co-occurring PTSD and TBI are diverse and multi-faceted (e.g. military mindset and resultant biases, multiple symptoms and patterns of overlap across comorbidities (Brenner, Vanderploeg, & Terrio, 2009). The existing literature regarding cumulative disadvantage may help to increase understanding regarding the complex and varied symptoms of those reporting comorbid conditions, and the importance of early screening and intervention (Brenner et al., 2009). It is suggested that best practice includes treating symptoms regardless of etiology to decrease military personnel and veteran burden of adversity (Brenner et al., 2009). It is suggested that further research is needed to explore evidence-based treatments for those with co-occurring disorders, the impact in this cohort of delayed mild TBI education regarding the

expectation for recovery, and the applicability of cumulative disadvantage theory to returning OEF/ OIF military personnel and veterans (Brenner et al., 2009).

Recent research has shown that for a group of OEF/OIF veterans, those who screened positive for MTBI are younger, more likely to have PTSD, more likely to report fair/poor overall health and unmet medical and psychological needs and score higher on measures of psychosocial difficulties and perceived barriers to mental healthcare (Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009b). Injuries involving loss of consciousness are associated with greater work-related difficulties and unmet psychological needs. PTSD mediates the relationship between MTBI and all of these outcomes (Pietrzak et al., 2009b).

Since 2008 the US Department of Defense has performed baseline cognitive testing and it is intended that these results can then be used to assess fitness for duty following injury by comparing individual baselines to post-injury scores (Jaffee & Meyer, 2009). It is postulated that comparison to one's own baseline can be a more sensitive indicator of an individual's post concussion cognitive function than comparison to a normative data set (Jaffee & Meyer, 2009).

Clinical practice guidelines for the evaluation and management of concussion have been developed to aid primary care providers as they encounter this patient population. Appropriate assessment and management recommendations for commonly occurring concussive symptom complexes are provided to primary care providers (Jaffee & Meyer, 2009). Similarly, algorithms of care have been developed for use in the deployed setting. The deployed setting clinical practice guidelines provide recommendations for care based on the unique aspects and resource limitations of the combat setting (Jaffee & Meyer, 2009). A review of the literature has also been undertaken by the VA/Department of Defense evidence-based work group, which yielded the recently released Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guidelines (2009). A key component of these guidelines has been incorporation of education emphasising expectations of recovery (Jaffee & Meyer, 2009).

Other ongoing US Department of Defense initiatives include the development of a Family Caregiver Curriculum (National Defense Authorisation Act, 2007) to conduct training for those families who provide care for members and former members of the Armed Forces with TBI, regardless of etiology (Jaffee & Meyer, 2009).

A recent investigation of veterans who produced a positive screen for TBI showed that 85% of the veterans met the American Congress of Rehabilitation Medicine definition of probable TBI (Hill, Mobo, & Cullen, 2009). Veterans who screened positive for MTBI using the TBI screening tool had high rates of PTSD, suggesting that interdisciplinary teams need to include mental health professionals. The TBI screening tool does not distinguish between TBI and PTSD, which may be explained by the fact that these two disorders have many of the same symptoms and are often caused by the same event (Hill et al., 2009).

Key informant interviews with 40 providers across the US from teams providing specialised TBI or PTSD services allowed providers to identify a number of challenges (Sayer et al., 2009). Providers perceived difficulty in scheduling and engaging patients with co-occurring MTBI and PTSD in treatment, determining the

aetiology of the patients' presenting problems, coordinating services and knowing whether or how to alter standard treatments (Sayer et al., 2009). There was consensus that patients with MTBI/PTSD often have pain and sleep disturbance. These findings point to the need for guidance for providers on best practices to assess and treat MTBI/PTSD.

MTBI had been associated with headaches, memory problems, sleep problems, and fainting, even after controlling for current psychiatric problems (including PTSD), as well as demographic variables, combat intensity, and comorbid medical conditions (Vanderploeg, Belanger, & Curtiss, 2009). MTBI is also associated with a current diagnosis of PTSD even controlling for other demographic, psychiatric and medical covariates. MTBI does not moderate or mediate the relationship between PTSD and current symptomatology, however, MTBI does adversely affect long term recovery from PTSD. Over a 16-year window of time, approximately 69% of those without a subsequent mild TBI recovered from their PTSD, while only 48% of those who subsequently sustained a mild TBI recovered from PTSD. Early assessment and treatment is indicated in order to alter negative life course trajectories (Brenner et al., 2009).

Rehabilitation and Injury

Community reintegration is challenging for injured veterans because it can be complicated by the co-occurrence of physical injuries with postwar adjustment difficulties such as PTSD, depression and substance abuse. It is important to assess community integration and to intervene early to prevent long term consequences for returning members families and society (Resnik, Plow, & Jette, 2009). A veteran-specific measure of community reintegration, known as the 'Community Reintegration for Service Members (CRIS) measure was developed and validated in 2009 (Resnik et al., 2009). Working subjects were found to have better CRIS scores than unemployed subjects. Those with PTSD, substance abuse or mental health problems had worse scores than those without these conditions. CRIS was found to have strong reliability, conceptual integrity and construct validity.

Although the majority of servicemen and women display resilience to adversity, for many veterans who present for post-acute rehabilitation there is a high degree of suffering. Post-acute polytrauma rehabilitation and integrated care of returning veterans should be advocated for and clinicians should be encouraged to work from a biopsychosocial perspective to help the veteran (Uomoto & Williams, 2009).

Psychosocial Rehabilitation

A comprehensive review of the literature relating to psychosocial rehabilitation for veteran populations was conducted by Hanley, Mathews and Lewis (2009). This review can be used as an information resource for a coordinated system of care that meets best practice standards.

Injury, Pain and PTSD

The relationship between battle injury-related factors and PTSD has not been well defined. Some studies have shown a positive association between injury severity and PTSD (e.g. Blanchard et al., 1995; Frommberger et al., 1998), but many others have failed to replicate this result (e.g. Bryant & Harvey, 1995; Ehlers, Mayou, & Bryant, 1998). Military personnel injured during combat (between September 2004 and February 2005) were followed (through November 2006) for a diagnosis of PTSD or any mental health outcome (MacGregor et al., 2009). During follow-up, 31.3% of patients received any type of mental health diagnosis and 17% received a PTSD diagnosis. Compared with minor injuries, those with moderate, serious and severe injuries were at a greater risk for being diagnosed with any mental health outcome. Similarly, those with serious and severe injuries were at greater risk for being diagnosed with PTSD. As such, injury severity is a significant predictor of any mental health diagnosis and PTSD diagnosis (MacGregor et al., 2009).

Recent recommendations for the assessment and treatment of chronic pain among those with TBI have indicated that there is a need for the incorporation of early and aggressive pain management strategies into existing treatment models (Gironda et al., 2009). Comorbid cognitive, medical and emotional impairments complicate re-adjustment to civilian life. It is likely that polytrauma pain and associated disorders such as PTSD and postconcussive syndrome will require the development of integrated approaches to clinical care which bridge traditional subspecialty divisions (Gironda et al., 2009).

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