

The mental health of the UK Armed Forces in the 21st century: resilience in the face of adversity

Deirdre MacManus,^{1,2} N Jones,³ S Wessely,¹ N T Fear,^{1,3} E Jones,¹ N Greenberg^{1,3}

¹King's Centre for Military Health Research, King's College London, Weston Education Centre, London, UK
²Department of Forensic and Neurodevelopmental Sciences, Institute of Psychiatry, King's College London, London, UK
³Academic Centre for Defence Mental Health (ACDMH), Weston Education Centre, London, UK

Correspondence to

Dr Deirdre MacManus, Department of Forensic and Neurodevelopmental Sciences, King's College London, Institute of Psychiatry PO 23, De Crespigny Park, London SE5 8AF, UK; Deirdre.macmanus@kcl.ac.uk

Received 20 November 2013
 Accepted 10 December 2013

ABSTRACT

The recent conflicts in Iraq and Afghanistan have attracted considerable political and media interest in the mental health of UK military personnel. As a result of the close operational collaboration between US and UK forces, there have inevitably been many comparisons drawn between the mental health status of the two forces. Considerable research activity suggests that the mental health of UK forces appear to have remained relatively resilient in spite of their considerable exposure to traumatic events; one stark exception to this is the high rates of alcohol misuse which seem to be related to deployment. This paper explores the recently published literature relating to UK military forces and attempts to draw conclusions about the reasons for the apparent resilience shown by the majority of the regular forces.

INTRODUCTION

The prolonged combat missions in Iraq and Afghanistan have been the most significant burden on the mental health of the UK Armed Forces in the 21st Century. Evidence from past conflicts has established a relationship between the rate of physical casualties (killed and wounded) and levels of psychiatric morbidity.¹ It is indisputable that deployment exposes servicemen and women to stressful and traumatic events that will not be encountered by the majority of the general UK population. Military personnel, especially those in combat roles, are a high-risk group for developing a range of mental health disorders including, but not limited to, post-traumatic stress disorder (PTSD).² Other studies have shown that, compared with the general population, military personnel are also at an increased risk of mental health and behaviour problems such as depression, anxiety disorders, alcohol misuse and aggressive behaviour.³ In addition to the recognition that deployment increases the risk of mental health problems, concerns about the mental health of troops returning from Iraq and Afghanistan were very likely to have been exacerbated by the legacy of 1990–1991 Gulf War. It has been estimated that 25% of military personnel returning from the first Gulf War reported symptoms of physical ill-health, sometimes severe, which became colloquially known as 'Gulf War Syndrome'.⁴ When UK forces deployed to the Gulf region once again and in comparable circumstances to the first Gulf War, it was feared that the conflict would give rise to similar health problems among deployed troops.

Since 2002, UK troops have been involved in a number of highly challenging military operations in Iraq and Afghanistan. In Iraq, a difficult counterinsurgency and reconstruction phase followed from

Key messages

- ▶ UK military regular personnel have remained resilient in spite of prolonged combat missions in Iraq and Afghanistan.
- ▶ Deployment can have a detrimental effect on specific sub-groups, such as reserves and combat personnel.
- ▶ There appears to be evidence that good training, leadership and unit cohesion promote resilience to mental health problems among service personnel.
- ▶ Access to high quality mental health services and a number of evidence based mitigation measures such as Decompression and Trauma Risk Management is also important.
- ▶ Future research will explore the nature of resilience in service personnel exposed to extreme or prolonged stress in the longer term.

the initial combat operations of 2003. As a result, the period of troop deployment and the number of casualties were both greater than had been anticipated. Furthermore, over this same period the intensity and scope of the conflict in Afghanistan increased: UK troops encountered a violent and protracted insurgency, especially in Helmand province, along with the challenges of dealing with the widespread use of improvised explosive devices and other forms of asymmetric threat such as snipers and suicide bombers.

Inevitably, these operations resulted in a number of psychological casualties and a wealth of research activity. Not since Vietnam has so much research been directed towards the mental health of service personnel. However, contrary to many people's expectations, deployment to Iraq and Afghanistan has not led to an overall increase in mental health problems among UK personnel.⁵ The overall number of personnel with symptoms of probable PTSD, considered a signature injury of these conflicts, has remained low. There have, however, been some groups who have been found to be at greater risk of developing mental health symptoms: deployed Reservists and combat personnel have greater levels of mental health symptoms upon return home, while alcohol misuse⁶ continues to be a common concern among Regulars and to a lesser degree among Reservists.⁷

In light of evidence of significant mental health morbidity among, for example, US Iraq and Afghanistan veterans,^{8,9} this article aims to review studies into the mental health of UK Armed Forces

To cite: MacManus D, Jones N, Wessely S, et al. *J R Army Med Corps* Published Online First: [please include Day Month Year] doi:10.1136/jramc-2013-000213

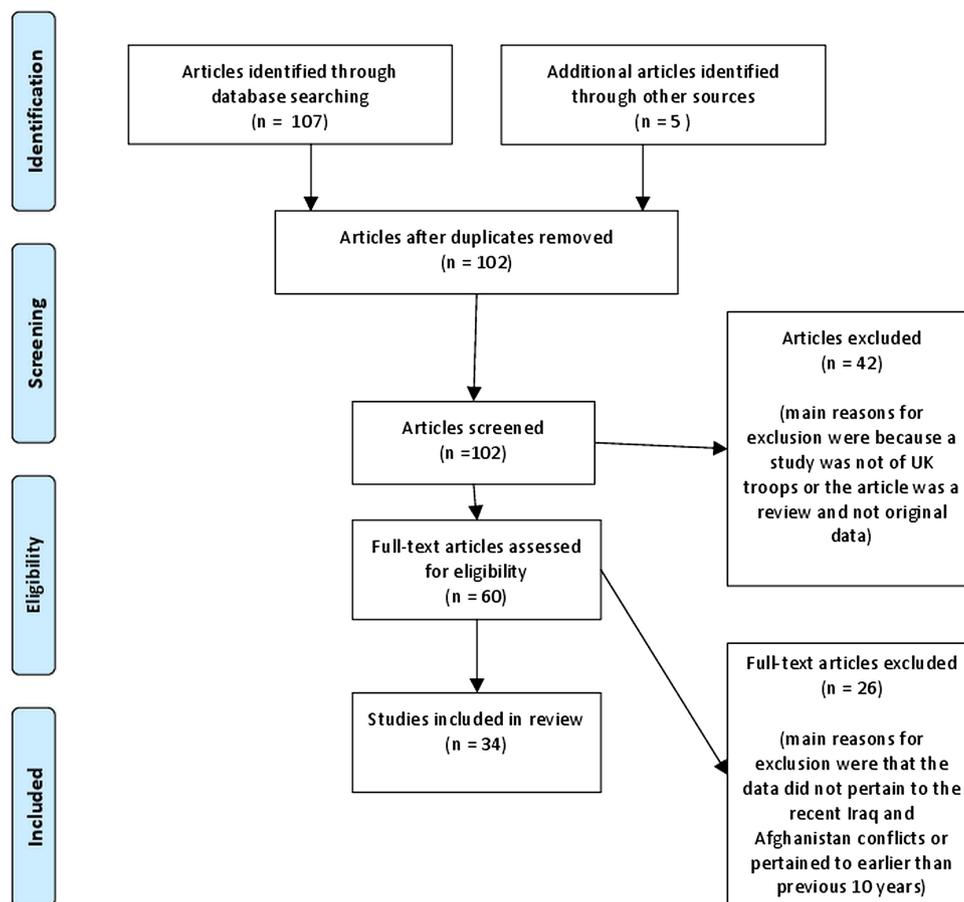


Figure 1 Flow diagram illustrating the retrieval, selection and exclusion of articles.

in the 21st Century, to appraise the evidence and possible explanations for seemingly greater resilience among UK troops.

METHODS

Articles were retrieved by one of the authors (DM) on 15 August 2013 by performing a literature search of Google Scholar, PsychINFO, MEDLINE, PubMed and Web of Science from 2003 to 2010 (Figure 1). Searches included key words: ('military' or 'Armed Forces' or 'army' or 'combat') and ('UK' or 'British') and ('mental health' or 'psychological' or 'well-being').

Studies were included if they reported data on UK Armed Forces pertaining to recent deployments in Iraq and Afghanistan, had at least one measure of psychological health or well-being, were peer-reviewed, and were reported in English. The search was limited to UK papers concerning operations in the last 10 years in order to ensure that they would coincide with the start of UK deployments to Iraq and increased levels of operational activity in Afghanistan. Other suitable non-UK papers were chosen for comparison by the authors and these were not limited to the last 10 years.

MENTAL HEALTH OF REGULAR UK MILITARY PERSONNEL

The bulk of research into the mental health of the UK Armed Forces in the last 15 years has been undertaken by the research group based at King's Centre for Military Health Research (KCMHR) at King's College London. They set up a large prospective cohort study coinciding with the beginning of the 2003 Iraq War to follow-up the health and well-being of those deployed compared with those who were not deployed. The

first phase of the KCMHR cohort study did not demonstrate any evidence of a new 'Iraq War Syndrome' in Regulars.¹⁰ However, evidence of high and rising rates of mental disorder among American troops deployed to Iraq¹¹ reinforced the importance of continuing monitoring the psychological health of UK military personnel. In contrast to US research findings, over the period following initial data collection, the overall rates of mental health problems in UK personnel deployed to Iraq or Afghanistan were found to remain stable.¹² Indeed, as is outlined below, the follow-up phase of the cohort study found no increase in most mental health problems among regular personnel who had served in Iraq or Afghanistan, compared with regular personnel not deployed to Iraq or Afghanistan.¹² It is important to note, however, that the rates of presentation for help by service personnel with mental health problems vary, depending on the nature of the presentation (initial or repeat attendances) and to which service it was made (primary or secondary care); nevertheless, the KCMHR data have shown that the background prevalence rate has remained stable.

In comparison with US research findings, the prevalence of symptoms of probable PTSD among UK Regulars following return from deployment remained low with estimates ranging between 1.3% and 4.8%.^{7, 13} A study of mental health among UK Regulars *during* deployment found 3.8% reported symptoms of probable PTSD.¹⁴ These figures were not as high as expected, considering that PTSD rates in the UK general population are approximately 3%.¹⁵

Symptoms of common mental disorders (such as depression and anxiety) were the most frequently reported mental health problems among UK military personnel deployed to Iraq or

Afghanistan. Based on the 12-item General Health Questionnaire, 16.7%–19.6% reported symptoms of common mental disorders,^{12 16 17} and 27.2% when using the Patient Health Questionnaire.⁷ However, there was no evidence that deployment to Iraq or Afghanistan increased the risk of common mental disorder among regular personnel, when compared with regular personnel not deployed to Iraq or Afghanistan.^{12 16} Indeed, similar rates of common mental disorders are found in the general UK population.¹⁵

Mild Traumatic Brain Injury (mTBI) is characterised by short-term loss of consciousness and/or altered mental state as a result of a head injury or blast explosions. mTBI has emerged as an important concern in the US military^{18 19} and, indeed, has been described in the USA as a ‘signature injury’ of the current conflicts in Iraq and Afghanistan.²⁰ A prevalence of 15% was found in a large survey of US infantry deployed to Iraq.¹⁸ Other US studies have reported estimates from 12% to 23%,^{21–23} rising to around 40% among injured personnel who had been exposed to a blast.²⁴ The prevalence of mTBI in UK military was found to be lower than that in the US military. Based on a large representative sample of UK regular personnel, Rona *et al*²⁵ found a prevalence of 4.4%, though those who had been deployed in a combat role had a higher rate of 9.5%. Therefore, while some impact of combat role on the prevalence of mTBI was observed among UK personnel, rates were still shown to be less than in the USA.

Alcohol misuse (drinking at a level likely to cause physical or psychological harm) is one of the most frequently reported mental health problem of UK troops deployed to Iraq or Afghanistan. In the study by KCMHR, between 16% and 20% of troops reported alcohol misuse.^{12 17} It is the only mental disorder which has been shown to be increased in prevalence among all deployed compared with non-deployed regular military personnel.¹² Although rates of alcohol misuse are particularly high among young men, who make up the majority of the UK Armed Forces (especially the combat troops), this alone did not account for the high rates of alcohol misuse in service personnel. Comparison of alcohol misuse in the same age and gender groups in the general population in England and Wales and the UK Armed Forces shows that both servicemen and women are more likely to misuse alcohol than their general population counterparts.⁶ Thus, the resilience exhibited in terms of mental health to the impact of deployment has not been replicated in terms of alcohol misuse.

MENTAL HEALTH STATUS OF COMBAT TROOPS

While regular personnel in general do not appear to have been affected by the potential negative impact of deployment, the role undertaken by deployed personnel has been shown to be an important risk factor for mental health outcomes. Combat exposure has been consistently identified as a risk factor for PTSD, and the risk has been found to increase with more intense combat experiences.¹² The intensity of traumatic exposures experienced in theatre has been shown to have a greater effect than most pre-trauma risk factors, such as a history of childhood adversity.²⁶ Therefore, when analysing data from the KCMHR cohort study, the effect on subsequent mental health of the participants’ role when on deployment was taken into account. Unsurprisingly, combat troops deployed to Iraq and Afghanistan show a small but significant increase in the risk of symptoms of PTSD compared with non-combat troops:^{12 16} approximately 7% of combat troops were found to have symptoms of PTSD following deployment to Iraq and Afghanistan.

However, not all combat troops are at increased risk of PTSD. Elite forces such as Royal Marines and Airborne personnel report fewer mental health problems compared with other infantry after deployment to Iraq.^{27 28} The exact reasons for this reduced risk are not fully understood but might be due to differences in selection and training. Compared with other infantry, elite forces have been found to have fewer pre-deployment risk factors, such as a history of childhood adversity, as well as higher levels of unit cohesion, which has been found to protect against mental health problems.²⁸

In addition and reflecting the pattern observed for PTSD, an increase in the rate of alcohol misuse was observed among combat troops deployed to Iraq^{12 16} and, as above, although young men predominate combat forces, age did not fully account for this increase in alcohol use among those deployed in combat roles.

VIOLENT OFFENDING

Post-deployment aggression and violence in soldiers recently returned from combat missions have been a long-standing issue.²⁹ Research from the Vietnam era in the USA was the first to show a statistical association with combat exposure and such behaviour among returning troops.^{30 31} MacManus *et al*³² found that self-reported aggressive and violent behaviour was prevalent among UK troops on return from deployment in Iraq with almost 13% reporting having assaulted someone in the weeks following return. Similar to other mental health problems reported thus far, they did not find that this was associated with deployment per se; troops deployed in a combat, rather than in another role, were more likely to report physical assaults following their return. The authors explored this in greater depth by linking the KCMHR cohort (almost 14 000 participants) with their official criminal records.³³ The findings confirmed that the risk of increased violent offending was associated with having served in a combat role on deployment and also highlighted that male military personnel had a greater lifetime risk of violent offending than a similarly aged sample of men from the general population. However, this study also found that military personnel were less likely to have committed a non-violent offence in their lifetime than a similarly aged sample from the general population. This implies that while military service, in particular serving in a combat role, can increase propensity for violent offending, it may also serve to lower the risk of non-violent offending. Unfortunately, we do not have similar data from the USA to draw a comparison.

SELF-HARM AND SUICIDE

Suicide has been a much publicised problem among US military personnel. Despite universal access to healthcare services, mandatory suicide prevention training and other preventive efforts, suicide has become one of the leading causes of death in the US military in recent years.^{34–36} Reported rates have risen sharply since 2005 with the highest rates reported in recent months alleged to exceed combat and deployment deaths.³⁷

Fear and colleagues examined suicide rates in the UK Armed Forces using mortality statistics from Defence Statistics between 1984 and 2007, a period which included the initial years of deployments to Iraq and Afghanistan.³⁸ The UK Armed Forces had statistically significantly fewer suicides than expected compared with the UK general population. This was evident for each of the three Services (Naval Service, Army and Royal Air Force). For each age group, the number of suicides in each Service was lower than the number expected based on UK general population rates, except for Army males under 20 years

of age, where there were 1.5 times more deaths than expected (standardised mortality rate (SMR)=150, 95% CI 118 to 190, based on 68 deaths). Given that, in the latter years of this study period the UK Armed Forces were subject to a number of unique occupational stressors, it is of interest that they continued to experience lower than expected numbers of suicides in comparison with the UK general population. This was true for each Service and all age groups except young males in the army. It is important to note that the data in the Fear *et al* study ended in 2007, and also concerns only serving personnel, and in addition does not differentiate between deployed and non-deployed. It is only very recently that all those who have served in Iraq/Afghanistan have had their records 'flagged' with the Office of National Statistics. Until such data are analysed one should be cautious about any statements regarding the impact of deployment, particularly mindful of the flawed anecdotal statements made over the years about the number of Falklands suicides.³⁹

In a subsequent study of self-harming behaviour, which used KCMHR cohort data, Hines and colleagues estimated self-harm in the UK military to vary between 1% and 5.6% compared with 4.9% in the general UK population.⁴⁰ They also found that contrary to predictions, self-harm in the UK military was not associated with deployment, but rather was linked to available social support in childhood and adulthood.⁴⁰ However, a telephone interview study by Pinder *et al*⁴¹ found that ex-Service personnel reported a lifetime prevalence of self-harm more than double that of serving personnel (10.5% vs 4.2%, respectively) and that younger personnel and those who had experienced more childhood adversity and psychological injury were more likely to report self-harming behaviour. Similar to other mental health and behaviour problems, it appears that suicide and self-harm in the UK military has not been directly linked to deployment experiences and raised suicide rates among younger men and elevated self-harming among young and ex-serving personnel may have more to do with pre-military risk factors and difficulties associated with post-service life.

MENTAL HEALTH OF RESERVE FORCES PERSONNEL

Reserve forces, which comprise volunteer reserves and those with a post-regular service residual commitment, have been widely used in recent overseas conflicts. Initial studies into the impact of deployment to Iraq and Afghanistan on the mental health of UK Reservists found that they were more vulnerable to negative outcomes than deployed regular personnel being twice as likely to report common mental disorders and probable PTSD after deployment compared with regular personnel.¹⁶ UK Reservists who deployed to the 2003 Iraq War were more than twice as likely to report symptoms of common mental disorders and probable PTSD compared with those who did not deploy.¹⁶ The same study did not find any such impact of deployment among Regulars. Empirical studies based in both the USA and UK have repeatedly demonstrated that, compared with regular military personnel, Reservists have an increased prevalence of mental illness post-deployment.^{8 12 16 42}

There have been a number of speculative views about the reasons for the high rates of mental illness among Reservists returning from deployment to Iraq and Afghanistan. One suggestion is that the finding may be due to the challenge of reintegrating into civilian life. A number of UK studies have explored the reasons for UK Reservists' apparent vulnerability to mental health problems and have suggested that it is related to their homecoming experiences.^{43 44} Harvey *et al*⁴⁴ found that, compared with regular personnel, Reservists were more likely to feel

unsupported by the military, and to have difficulties with social functioning, in the post-deployment period. Perceived lack of support from the military was associated with increased reporting of probable PTSD and alcohol misuse. Additionally, low levels of non-military, post-deployment social support and participation were associated with increased reporting of common mental disorder, probable PTSD, and alcohol misuse.

Until recently, the pattern of longer term post-deployment psychological morbidity for UK Reservists was unknown. Harvey *et al*⁴⁵ conducted a longitudinal analysis of 552 UK Reservists deployed to Iraq in 2003 and 391 non-deployed Reservists who served during the same period. Measures of mental health and social functioning were collected around 16 months and approximately 5 years after potential and actual deployment. At the first follow-up, deployment was associated with increased common mental disorder, PTSD and poorer general health. By the second follow-up, those who had deployed were no longer at increased risk for common mental disorder or poor general health and reported good levels of social functioning. However, those who deployed continued to have over twice the odds of PTSD and were more likely to report actual or serious consideration of separation from their partner. In conclusion, the authors found that the majority of mental health and social problems among Reservists following deployment are transient. However, they remain at increased risk of PTSD and relationship problems 5 years after their tour of duty.

RESILIENCE AMONG UK MILITARY PERSONNEL COMPARED WITH INTERNATIONAL COUNTERPARTS?

Research to date has overwhelmingly found that the rates of mental health problems reported by UK military personnel, especially following return from recent deployment, have been lower than predicted by the media and some military charities. There are some exceptions to this, however, most importantly alcohol misuse and violence. Research has also highlighted the vulnerability of certain groups of at-risk personnel, namely, those deployed in a combat role and reserve personnel. It has also revealed certain groups who demonstrate increased resilience such as the elite forces.

While it is difficult to compare rates between nations, a consistent finding of the last 20 years is that reported mental health problems tend to be higher among service personnel and veterans of the USA compared with the UK, Canada, Germany and Denmark.⁴⁶ Hoge and Castro⁴⁷ reported PTSD rates among returning US troops of between 5% and 10%, and recent studies based on Department of Veteran Affairs data have recorded PTSD rates between 21% and 29%,⁴⁸ at a time when UK researchers reported rates of between 2% and 7%.^{5 12} Explanations for these international differences have been various. Research has shown that US personnel tend to be younger and of lower socio-economic background than their UK counterparts and also have, to date, undertaken longer tours of duty (US troops routinely undertake 12 month deployments, and often longer, compared with 6 months for UK forces). The US military also deploys a greater proportion of Reservists. There are considerable international differences in the entitlement to healthcare and benefits for veterans with marked differences in the way both are delivered. Earlier US studies that found an increased prevalence of PTSD compared with UK troops were undertaken when US troops were engaged in more dangerous duties than UK troops and thus combat exposure, prior to the recent operations in Afghanistan, may have explained US and UK differences. However, since 2006 combat

exposure has been similar for troops from both nations, this is unlikely to be a major explanatory factor. Furthermore, US culture may be more receptive to psychological disorder (eg, see the high rates of PTSD recorded by the National Vietnam Veterans' Readjustment Study⁴⁹). Another potential impediment to assessing the true prevalence of mental disorder symptoms is the unwillingness of military personnel to declare symptoms as a consequence of stigmatising beliefs about mental health. While psychiatric stigma among UK forces is reducing with time,⁵⁰ it persists as a potential barrier to help-seeking.⁵¹ However, a recent study which compared US and UK troops, along with troops from Australia and Canada, who had just left Afghanistan found comparable rates of reported stigma.⁵²

CAN MILITARY LEADERSHIP AND MANAGEMENT-RELATED FACTORS INCREASE THE RESILIENCE OF MILITARY PERSONNEL?

Insight into factors that may increase resilience among UK troops was provided by Jones *et al*⁵³ who carried out a study into the potential mitigating effects of cohesion, morale and leadership on the risk of developing mental health problems. To assess the possible impact of these factors on PTSD symptoms and common mental disorders resulting from combat exposure, a sample of UK personnel serving in Afghanistan in 2010 were asked to complete a self-report survey about aspects of their current deployment, including perceived levels of cohesion, morale, leadership, combat exposure and their mental health status. Outcomes were symptoms of common mental disorder and symptoms of PTSD. Combat exposure was associated with both PTSD symptoms and symptoms of common mental disorder. Of the 1431 participants, 17.1% reported caseness levels of common mental disorder, and 2.7% were classified as probable PTSD cases. Greater self-reported levels of unit cohesion, morale and perceived good leadership were all associated with lower levels of common mental disorder and PTSD. Although the authors accepted the limitations of assessing cause in a cross-sectional study, there was some tentative evidence that these factors may help to modulate the effects of combat exposure and mental health symptoms among UK Armed Forces personnel deployed to Afghanistan. This study thus provides support for the hypothesis that within organisations, such as the military which rely on cohesive teams, resilience is best thought of as a social construct, being an interaction between individuals.

Unlike the majority of the US military, the UK Armed Forces require personnel to spend around 36 h attending third location decompression (TLD) before they return to their home bases. TLD is a social, supportive and educational intervention following prolonged operational deployment which aims to smooth the transition between operations and returning home. The UK Academic Centre for Defence Mental Health assessed whether TLD impacted upon both mental health and post-deployment readjustment. Jones *et al*^{54 55} suggested that TLD had a positive impact upon mental health outcomes (PTSD and multiple physical symptoms) and levels of harmful alcohol use. However, when the samples were stratified by combat exposure, post-deployment readjustment was similar for all exposure levels, and personnel experiencing low and moderate levels of combat exposure experienced the greatest positive mental health effects. Although the Jones *et al* paper⁵⁹ used a strategy that allowed for pseudorandomisation (propensity scores were used which allowed for the analyses of observational data so that some of the particular characteristics of a randomised controlled trial are mimicked), the true value or otherwise of TLD can only be

properly ascertained via a randomised controlled trial, the opportunity for which has probably now passed.

The UK military has also invested considerably in ensuring that personnel within deployed units are able to support each other after traumatic events. The Trauma Risk Management (TRiM) programme has been widely used by the Royal Marines since the late 1990s⁵⁶ and has been in widespread use by the rest of the Armed Forces since 2007.⁵⁷ TRiM is a peer support programme which aims to provide units with an integral peer support process which is designed to assess the psychological risk in trauma exposed personnel and engage them with helping services when and if needed. TRiM has been the subject of a number of studies which have shown that it is highly acceptable to military personnel, capable of detecting changes in post incident mental health, helps to mobilise social support⁵⁸ and improves organisational function while not causing harm.⁵⁹ TRiM, which is not routinely used by the US military, although their senior command are considering whether it might be useful for their personnel, is thus another potential pro-resilience factor which works to ensure that military personnel operating in highly challenging environments can properly support each other.

CONCLUSIONS

The evidence presented in this paper shows that, in the main, UK military personnel have remained resilient in spite of having suffered significant numbers of fatalities and casualties and having undertaken prolonged combat missions in Iraq and Afghanistan. However, the many scientific publications discussed in the paper suggest that deployment can have a detrimental effect on specific sub-groups, such as reserves and combat personnel. Given the large number of Service personnel who have deployed to Iraq and Afghanistan over recent years, there is likely to be a small, but important group of veterans with mental health conditions attributable to their service who will require specialist mental healthcare provision in the years ahead. While it is not possible to be certain about the likely vast range of factors which are associated with resilience in UK troops, there appears to be some evidence that the considerable efforts the UK Armed Forces have made to ensure that deployed personnel are well trained, well led, cohesive, have access to high quality mental health services and a number of evidence based mitigation measures such as TLD and TRiM are important. However, the longer term psychological effects of these deployments remain to be seen and research opportunities exist to explore the nature of resilience in service personnel exposed to extreme or prolonged stress in the longer term.

Contributors DM conducted the literature search and wrote the review. NG conceived of the idea and contributed to the writing of the review. SW, NTF, EJ and NJ contributed informed and constructive comments on the drafted review which significantly shaped the final product.

Competing interests NG is an ex-serving full-time member of the UK Armed Forces, and is currently employed by King's College London. NTF and SW are employed by the Academic Centre for Defence Mental Health, based at King's College London which receives funding from the UK Ministry of Defence. SW is also honorary civilian consultant advisor in psychiatry to the British Army and a trustee of Combat Stress, a UK charity that provides service and support for veterans with mental health problems.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Jones E, Wessely S. Psychiatric battle casualties: an intra- and interwar comparison. *Br J Psychiatry* 2001;178:242-7.
- 2 Kessler RC, Sonnega A, Bromet E, *et al*. Posttraumatic stress disorder in the national comorbidity survey. *Arch Gen Psychiatry* 1995;52:1048-60.

Review

- 3 Kang HK, Hyams KC. Mental health care needs among recent war veterans. *N Engl J Med* 2005;352:1289.
- 4 Unwin C, Blatchley N, Coker W, *et al.* Health of UK servicemen who served in Persian Gulf War. *Lancet* 1999;353:169–78.
- 5 Sundin J, Forbes H, Fear NT, *et al.* The impact of the conflicts of Iraq and Afghanistan: a UK perspective. *Int Rev Psychiatry* 2011;23:153–9.
- 6 Fear NT, Iversen A, Meltzer H, *et al.* Patterns of drinking in the UK Armed Forces. *Addiction* 2007;102:1749–59.
- 7 Iversen A, van Staden L, Hughes J, *et al.* The prevalence of common mental disorders and PTSD in the UK military: using data from a clinical interview-based study. *BMC Psychiatry* 2009;9:68.
- 8 Milliken C, Auchterlonie J, Hoge C. Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *J Am Med Assoc* 2007;298:2141–8.
- 9 Hoge C, Auchterlonie J, Milliken C. Mental health problems, use of mental health services, and attrition from military service after returning from deployment to Iraq or Afghanistan. *JAMA* 2006;295:1023–32.
- 10 Horn O, Hull L, Jones M, *et al.* Is there an Iraq war syndrome? Comparison of the health of UK service personnel after the Gulf and Iraq wars. *Lancet* 2006;367:1742–6.
- 11 Hoge C, Castro C, Messer S, *et al.* Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *N Engl J Med* 2004;351:13–22.
- 12 Fear NT, Jones M, Murphy D, *et al.* What are the consequences of deployment to Iraq and Afghanistan on the mental health of the UK armed forces? A cohort study. *Lancet* 2010;375:1783–97.
- 13 Rona RJ, Fear NT, Hull L, *et al.* Mental health consequences of overstretch in the UK armed forces: first phase of a cohort study. *BMJ* 2007;335:603.
- 14 Mulligan K, Jones N, Woodhead C, *et al.* Mental health of UK military personnel while on deployment in Iraq. *Br J Psychiatry* 2010;197:405–10.
- 15 Jenkins R, Meltzer H, Bebbington P, *et al.* The British Mental Health Survey Programme: achievements and latest findings. *Soc Psychiatry Psychiatr Epidemiol* 2009;44:899–904.
- 16 Hotopf M, Hull L, Fear NT, *et al.* The health of UK military personnel who deployed to the 2003 Iraq war: a cohort study. *Lancet* 2006;367:1731–41.
- 17 Rona RJ, Hooper R, Jones M, *et al.* Mental health screening in armed forces before the Iraq war and prevention of subsequent psychological morbidity: follow-up study. *Br Med J* 2006;333:991–4A.
- 18 Hoge CW, McGurk D, Thomas JL, *et al.* Mild Traumatic Brain Injury in U.S. Soldiers Returning from Iraq. *N Engl J Med* 2008;358:453–63.
- 19 Warden DL, Gordon B, McAllister TW, *et al.* Guidelines for the pharmacologic treatment of neurobehavioral sequelae of traumatic brain injury. *J Neurotrauma* 2006;23:1468–501.
- 20 Jones E, Fear NT, Wessely S. Shell Shock and Mild Traumatic Brain Injury: A Historical Review. *Am J Psychiat* 2007;164:1641–5.
- 21 Pietrzak RH, Johnson DC, Goldstein MB, *et al.* Posttraumatic stress disorder mediates the relationship between mild traumatic brain injury and health and psychosocial functioning in veterans of Operations Enduring Freedom and Iraqi Freedom. *J Nerv Ment Dis* 2009;197:748–53.
- 22 Schneiderman AI, Braver ER, Kang HK. Understanding Sequelae of Injury Mechanisms and Mild Traumatic Brain Injury Incurred during the Conflicts in Iraq and Afghanistan: Persistent Postconcussive Symptoms and Posttraumatic Stress Disorder. *Am J Epidemiol* 2008;167:1446–52.
- 23 Tanielian T, Jaycox L. Invisible wounds of war: psychological and cognitive injuries, their consequences, and services to assist recovery. 2008.
- 24 Okie S. Traumatic Brain Injury in the War Zone. *N Engl J Med* 2005;352:2043–7.
- 25 Rona RJ, Jones M, Fear NT, *et al.* Mild traumatic brain injury in UK military personnel returning from Afghanistan and Iraq: cohort and cross-sectional analyses. *J Head Trauma Rehabil* 2012;27:33–44.
- 26 Ozer EJ, Best SR, Lipsey TL, *et al.* Predictors of posttraumatic stress disorder and symptoms in adults: a meta-analysis. *Psychol Bull* 2003;129:52–73.
- 27 Iversen A, Fear N, Ehlers A, *et al.* Risk factors for post-traumatic stress disorder among UK Armed Forces personnel. *Psychol Med* 2008;38:511–22.
- 28 Sundin J, Jones N, Greenberg N, *et al.* Mental health among commando, airborne and other UK infantry personnel. *Occup Med* 2010;60:552–9.
- 29 Allport A. *Demobbed: coming home after the Second World War*. Yale University Press, 2009.
- 30 Calvert WE, Hutchinson RL. Vietnam veteran levels of combat: related to later violence? *J Traumatic Stress* 1990;3:103–13.
- 31 Yager T, Lauffer R, Gallops M. Some problems associated with war experience in men of the vietnam generation. *Arch Gen Psychiatry* 1984;41:327–33.
- 32 MacManus D, Dean K, Al Bakir M, *et al.* Violent behaviour in UK military personnel returning home after deployment. *Psychol Med* 2012;42:1663–73.
- 33 MacManus D, Dean K, Jones M, *et al.* Violent offending by UK military personnel deployed to Iraq and Afghanistan: a data linkage cohort study. *Lancet* 2013;381:907–17.
- 34 Kang HK, Bullman TA. Risk of suicide among US veterans after returning from the Iraq or Afghanistan war zones. *JAMA* 2008;300:652–3.
- 35 Black SA, Galloway MS, Bell MR, *et al.* Prevalence and risk factors associated with suicides of Army soldiers 2001–2009. *Mil Psychol* 2011;23:433–51.
- 36 Armed Forces Health Surveillance Centre (AHFSC). Deaths by suicide while on active duty, active and reserve components, U.S. Armed Forces, 1998–2011. *Msmr* 2012;19:7–10.
- 37 Pilkington E. US military struggling to stop suicide epidemic among war veterans. *Guardian* 1 Feb 2013.
- 38 Fear NT, Ward VR, Harrison K, *et al.* Suicide among male regular UK Armed Forces personnel, 1984–2007. *Occup Environ Med* 2009;66:438–41.
- 39 Holmes J, Fear NT, Harrison K, *et al.* Suicide among Falkland war veterans. *BMJ* 2013;346–51.
- 40 Hines LA, Jawahar K, Wessely S, *et al.* Self-harm in the UK military. *Occup Med* 2013;63:354–7.
- 41 Pinder RJ, Iversen AC, Kapur N, *et al.* Self-harm and attempted suicide among UK Armed Forces personnel: Results of a cross-sectional survey. *Int J Soc Psychiatry* 2012;58:433–9.
- 42 Thomas JL, Wilk JE, Riviere LA, *et al.* Prevalence of mental health problems and functional impairment among active component and National Guard soldiers 3 and 12 months following combat in Iraq. *Arch Gen Psychiatry* 2010;67:614–23.
- 43 Browne T, Hull L, Horn O, *et al.* Explanations for the increase in mental health problems in UK reserve forces who have served in Iraq. *Br J Psychiatry* 2007;190:484–9.
- 44 Harvey SB, Hatch SL, Jones M, *et al.* Coming home: social functioning and the mental health of UK reservists on return from deployment to Iraq or Afghanistan. *Ann Epidemiol* 2011;21:666–72.
- 45 Harvey SB, Hatch SL, Jones M, *et al.* The long-term consequences of military deployment: a 5-year cohort study of United Kingdom reservists deployed to Iraq in 2003. *Am J Epidemiol* 2012;176:1177–84.
- 46 Richardson LK, Frueh BC, Acierno R. Prevalence estimates of combat-related post-traumatic stress disorder: critical review. *Aust N Z J Psychiatry* 2010;44:4–19.
- 47 Hoge C, Castro C. Post-traumatic stress disorder in UK and US forces deployed to Iraq. *Lancet* 2006;368:837.
- 48 Wells TS, Miller SC, Adler AB, *et al.* Mental health impact of the Iraq and Afghanistan conflicts: a review of US research, service provision, and programmatic responses. *Int Rev Psychiatry* 2011;23:144–52.
- 49 Kulka RA, Schlenger WE, Fairbank JA, *et al.* *The National Vietnam Veterans Readjustment Study: tables of findings and technical appendices*. New York: Brunner/Mazel, 1990.
- 50 Osório C, Jones N, Fertout M, *et al.* Changes in stigma and barriers to care over time in U.K. armed forces deployed to Afghanistan and Iraq between 2008 and 2011. *Mil Med* 2013;178:846–53.
- 51 Osório C, Jones N, Fertout M, *et al.* Perceptions of stigma and barriers to care among UK military personnel deployed to Afghanistan and Iraq. *Anxiety Stress Coping* 2012;26:539–57.
- 52 Gould M, Adler A, Zamorski M, *et al.* Do stigma and other perceived barriers to mental health care differ across Armed Forces? *J R Soc Med* 2010;103:148–56.
- 53 Jones N, Seddon R, Fear NT, *et al.* Leadership, cohesion, morale, and the mental health of UK armed forces in Afghanistan. *Psychiatry Interpers Biol Processes* 2012;75:49–59.
- 54 Jones N, Burdett H, Wessely S, *et al.* The subjective utility of early psychosocial interventions following combat deployment. *Occup Med* 2011;61:102–7.
- 55 Jones N, Jones M, Fear NT, *et al.* Can mental health and readjustment be improved in UK military personnel by a brief period of structured postdeployment rest (third location decompression)? *Occup Environ Med* 2013;70:439–45.
- 56 Jones N, Roberts P, Greenberg N. Peer-group risk assessment: a post-traumatic management strategy for hierarchical organizations. *Occup Med* 2003;53:469–75.
- 57 Greenberg N, Langston V, Jones N. Trauma Risk Management (TRiM) in the UK armed forces. *J R Army Med Corps* 2008;154:124–7.
- 58 Frappell-Cooke W, Gulina M, Green K, *et al.* Does trauma risk management reduce psychological distress in deployed troops? *Occup Med* 2010;60:645–50.
- 59 Greenberg N, Langston V, Everitt B, *et al.* A cluster randomized controlled trial to determine the efficacy of Trauma Risk Management (TRiM) in a military population. *J Trauma Stress* 2010;23:430–6.

JRAMC

The mental health of the UK Armed Forces in the 21st century: resilience in the face of adversity

Deirdre MacManus, N Jones, S Wessely, et al.

J R Army Med Corps published online February 26, 2014

doi: 10.1136/jramc-2013-000213

Updated information and services can be found at:
<http://jramc.bmj.com/content/early/2014/01/23/jramc-2013-000213.full.html>

These include:

- | | |
|-------------------------------|---|
| References | This article cites 54 articles, 18 of which can be accessed free at:
http://jramc.bmj.com/content/early/2014/01/23/jramc-2013-000213.full.html#ref-list-1 |
| P<P | Published online February 26, 2014 in advance of the print journal. |
| Email alerting service | Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article. |
-

- | | |
|--------------------------|---|
| Topic Collections | Articles on similar topics can be found in the following collections
Press releases (0 articles) |
|--------------------------|---|
-

Notes

Advance online articles have been peer reviewed, accepted for publication, edited and typeset, but have not yet appeared in the paper journal. Advance online articles are citable and establish publication priority; they are indexed by PubMed from initial publication. Citations to Advance online articles must include the digital object identifier (DOIs) and date of initial publication.

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>