

## EDITORIAL

# PTSD in the armed forces: What have we learned from the recent cohort studies of Iraq/Afghanistan?

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### Abstract

Post-traumatic stress disorder (PTSD) was formally recognised as a psychiatric disorder in 1980, largely in response to America's attempts to make sense of the costs of the Vietnam war [Wessely, S., & Jones, E. (2004). Psychiatry and the 'lessons of Vietnam': What were they, and are they still relevant? *War & Society*, 22(1), 89–103.]. Interestingly, all of this occurred without much contribution from epidemiology, which came later (Wessely & Jones, 2004). This cannot be said of the current conflicts, where from the outset there has been a focus of attention on the epidemiology of PTSD in those who served in either Iraq or Afghanistan, even whilst the conflicts were ongoing. In this editorial, we focus on this recent epidemiological contribution to the understanding of PTSD in military personnel.

**Keywords:** *post-traumatic stress disorder, epidemiology, cohort studies, trajectories*

The current operations of the US, UK and many coalition forces began in 2001 with the deployment to Afghanistan. Numerous studies have taken place since then of the mental health of those who have served there and in Iraq, looking at issues such as prevalence and/or risk factors. The majority of these studies have been cross-sectional in design. This has, however, led to problems, for example, the wide variation in the prevalence of post-traumatic stress disorder (PTSD) reported, albeit partly explained by differences in methodology and sampling frames (Sundin et al., 2010). Cross-sectional studies also have limitations in addressing causality, with a potential for non-random recall bias, influenced by current mental health (Wilson et al., 2008). But most important for the theme of this editorial, they are unable to provide information on prognosis, relapse, recovery and timing of onset.

Yet despite the drawbacks of cross-sectional studies there are very few longitudinal cohort studies related to the Iraq and Afghanistan wars. Cohort studies are characterised by the follow-up of groups according to a shared exposure. A cohort study is invaluable to the investigation of a relatively new disorder, because it allows examination of the temporal effect of

risk factors on PTSD, the trajectory of PTSD over time in terms of prognostic factors, latency of PTSD symptoms in relation to traumatic events and the relative importance of different trajectories of PTSD.

An example of the use of the cohort design in a military population is the King's Centre for Military Health Research (KCMHR) study which began in 2004 after the start of the Iraq war (Fear et al., 2010; Iversen et al., 2009). After the initial wave of data collection between 2004 and 2006, a second wave took place from 2007 to 2009 and a third is about to start. There are other longitudinal military studies ongoing, but the US Millennium Cohort is the most comparable (Pinder et al., 2012); in particular they also follow-up personnel, not only whilst they remain in service, but after they have left.

### What do we know about risk factors for PTSD?

The UK and US groups were both able to prospectively demonstrate that it was not deployment per se, but combat exposure during deployment to Iraq which was highly associated with PTSD, even when pre-deployment mental status was adjusted for (Rona et al., 2009; Smith et al., 2008). However, this effect seemed to differ in reservists, with increased odds of PTSD in those who had previously deployed, which persisted five years after their deployment (Harvey et al., 2012). Additional risk factors across studies relate to unit support, such as sense of comradeship with others in the unit, which are protective for PTSD (Jones et al., 2012); however, these effects were not as strong as the contribution of psychological distress (Rona et al., 2009). Later findings have shown that having experienced childhood adversity, or a serious accident (e.g. drink- or fight-related accident), may be as important as combat role in explaining the risk of PTSD (Jones et al., 2013). This highlights the prominence of non-deployment/military-related factors in the aetiology of PTSD. Likewise, data collected during deployment showed that perceived home difficulties were also associated with PTSD (Mulligan et al., 2012) and support from informal networks has been highlighted as fundamental on return from deployment (Greenberg et al., 2003). In summary, deployment is not the main factor related to PTSD, combat is not the only trauma and reservists may have different mental health needs compared to regulars (Jones et al., 2011).

### Trajectories of PTSD

One of the most contentious areas in PTSD research is the question of its trajectory: delayed-onset PTSD and persistent PTSD have most commonly been examined using longitudinal military data. Delayed-onset PTSD was included in the original DSM-III criteria for PTSD and was defined as onset occurring at least six months after the traumatic event (American Psychiatric Association, 1980). There is no guidance in these criteria as to whether the onset of symptoms refers to any PTSD symptoms or if it only refers to the full PTSD diagnosis, but much of the evidence suggests that "true" delayed-onset PTSD (i.e. where there is no evidence of any previous symptoms) is uncommon (Andrews et al., 2007). Much more common is that people have prior symptoms that fall short of caseness before finally fulfilling the criteria. This became clear in the only UK prospective military study (Goodwin et al., 2012) which found that 3.5% of a total of 1397 service personnel met the DSM-IV criteria for delayed-onset PTSD, representing 46% of the overall cases of probable PTSD. A large proportion of those with a delayed-onset had symptoms compatible with subthreshold PTSD at the previous phase of data collection, supporting findings from different populations (Andrews et al., 2007). In addition, psychiatric morbidity at the first phase, including subthreshold PTSD, increased the risk of delayed-onset PTSD by the follow-up phase, but

any factor on its own had a low predictive value (Goodwin et al., 2012). In terms of the mechanisms for delayed-onset, individuals exposed to further stressful events after the original trauma have been found to be more at risk of PTSD with a delayed onset (Pietrzak et al., 2013). Hence, delayed-onset PTSD may be more common in the military and other occupations (e.g. police) who are exposed to multiple stressful events.

Whilst it is established that a large proportion of those who meet the criteria for PTSD at an earlier assessment will have remitted by a later follow-up, it is important to understand the risks associated with symptoms that persist. In the KCMHR cohort, of those who met the criteria for probable PTSD at a baseline assessment, two-thirds had either fully remitted or partially remitted (met criteria for subthreshold PTSD) by follow-up (Rona et al., 2012). However, one-third experienced PTSD which persisted and in agreement with previous studies, lack of support was the strongest risk factor associated with this PTSD trajectory (Koenen et al., 2003; Schnurr et al., 2004). Factors such as deploying but not with parent unit, reporting lack of support post-deployment and exiting the Armed Forces were all associated with persistent PTSD (Rona et al., 2012). There is evidence too that depression, alcohol misuse and multiple physical symptoms are associated with persistent PTSD (Koenen et al., 2003; Schindel-Allon et al., 2010). But in spite of these findings, the ability to predict persistent PTSD is relatively low unless all the risk factors are concurrent, which would be a relatively rare occurrence.

Advanced methodologies have recently been used to assess trajectories of PTSD including latent class growth analysis and growth mixture modelling. The use of these methods in military cohorts includes the Danish study of 746 personnel assessing PTSD at five time points, before, during and three times after deployment (the last assessment at six months post deployment) (Berntsen et al., 2012), and the US Millennium cohort which assessed PTSD scores pre-deployment with two further follow-ups (Bonanno et al., 2012). These methods do not define groups at the outset and instead identify latent classes by grouping individuals who display similar patterns of PTSD scores over time. Whilst there was heterogeneity between these studies, both found that over 80% of their samples were classified in “resilient” trajectories, with additional evidence for delayed-onset (worsening) trajectories. The remaining classes differed between studies, with the Millennium cohort finding an improving and high stable trajectory in those with a higher level of PTSD symptoms pre-deployment, and the Danish cohort finding evidence for some improvement either during or on return from deployment with subsequent increases in PTSD over time (Berntsen et al., 2012; Bonanno et al., 2012). Military data from trajectory studies do not seem to show that the prevalence of PTSD is increasing over time, because the new delayed-onset cases may be offset by the improving trajectories, with similar proportions of personnel in these opposite classes. However, this contrasts to other US data indicating a general increase in PTSD symptoms over time after return from deployment (Milliken et al., 2007), an effect that is not seen in the UK (Fear et al., 2010). Further research on trajectories is required to understand this difference between the UK and USA, with a focus not only on delayed-onset PTSD, but also on differences in rates of remission between these countries.

### **PTSD: a suitable case for screening?**

Identifying appropriate screening tools for those at risk of delayed-onset PTSD would be valuable, but new data acquired from the military studies suggest this may be problematic, particularly without an understanding of non-military factors. The evidence from the recent trajectory studies also suggests that there is such heterogeneity both between individuals and across studies, that it would not be feasible to predict the course of an individual’s

PTSD symptoms. The purpose of screening for PTSD would be to improve the prognosis of the condition by the use of efficacious treatment, but identification of PTSD may not be helpful if a large proportion of cases can improve without treatment (Rona et al., 2005). This issue is also complicated by what is known about help seeking and stigma and only a proportion of personnel with PTSD will actually seek help (Ben-Zeev et al., 2012; Iversen et al., 2011; Langston et al., 2010).

## Conclusions

In conclusion, the developments in military epidemiology have allowed cohort studies to confirm that combat experience is temporally related to PTSD. Yet, the majority of those who are deployed seem to be resilient. Across studies there are other common prospective vulnerability factors for PTSD, including psychiatric co-morbidity, alcohol misuse and lack of support. Whilst cross-sectional studies have found evidence to suggest that events outside of the military are important risks for PTSD, this needs to be investigated further in longitudinal research. Delayed-onset PTSD and other symptom trajectories which increase following deployment may be most important from a military perspective, but there is a need to further understand the reasons for the observed heterogeneity of PTSD trajectories.

**Declaration of Interest:** The authors report no conflict of interest.

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