

Do medical services personnel who deployed to the Iraq war have worse mental health than other deployed personnel?*

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Aim: There is evidence of increased health care utilization by medical personnel (medics) compared to other trades in the UK Armed Forces. The aim of this study was to compare the burden of mental ill health in deployed medics with all other trades during the Iraq war. **Methods:** Participants' main duty during deployment was identified from responses to a questionnaire and verified from Service databases. Psychological health outcomes included psychological distress, post-traumatic stress disorder, multiple physical symptoms, fatigue and heavy drinking. **Results:** A total of 479 out of 5824 participants had a medical role. Medics were more likely to report psychological distress (OR 1.30, 95% CI 1.00–1.70), multiple physical symptoms (OR 1.65, 95% CI 1.20–2.27) and, if men, fatigue (1.38, 95% CI 1.05–1.81) than other personnel. Female medics were less likely to report fatigue (0.57, 95% CI 0.35–0.92). Neither post-traumatic stress disorder nor heavy drinking symptoms were associated with a medical role. Traumatic medical experiences, lower group cohesion and preparedness, and post-deployment experiences explained the positive associations with psychological ill health. Medics made greater use of medical facilities than other trades. **Conclusions:** There is a small excess of psychological ill health in medics, which can be explained by poorer group cohesion, traumatic medical and post-deployment experiences. The association of mental ill health with a medical role was not the consequence of a larger proportion of reservists in this group.

Keywords: Iraq, medical personnel, mental health, military

Introduction

Deployed military medics may be subjected to considerable stress because of their increased exposure to the death or injury of others.¹ There have been some reports that military medics have more mental ill health than their colleagues in other trades. A small study of non-deployed UK military healthcare professionals found an overall prevalence of psychological ill health of 35%.² The majority of reports on mental health of military medical personnel are of small studies that do not include a control group making it difficult to gauge whether mental ill health is more common in medics than in other military personnel.^{3–5}

Medics are over represented amongst those referred to mental health services and in those aero-medically evacuated from Iraq. A total of 44% of all reservists, referred to field mental health services in Iraq between February and June 2003, were medics as were 7% of all psychiatric evacuees subsequently admitted to a military in-patient psychiatric facility during the early phase of the Iraq war.^{6,7} These findings are consistent with studies which have reported that physical and psychological ill health are high in UK civilian health care workers but might simply reflect the relative ease of access to medical services by military medics.^{8–10}

Medics make up ~3% of the total strength of regular UK Armed Forces, with ~6% of deployed personnel during

Operation TELIC 1 (the military codename for the initial phase of the Iraq war between 18 January 2003 and 28 June 2003) having a medical role. A recent National Audit Office (NAO) report identified medics as belonging to a 'pinch point trade' in all three Services, with 'insufficient trained personnel to perform operational duties while enabling guideline levels on amount of time away from home to be met'. The NAO report estimated that 34% of A&E nurses and 21% general surgeons were above guideline thresholds for duration of deployments. Operational commitments are being met by the use of large numbers of reservists.¹¹ In previous papers we have shown both reservist status¹² and so called 'overstretch'¹³ are associated with poorer health outcomes for deployed personnel.

The aim of this study was to compare the burden of psychological ill health in deployed military medics with that in all other trades who had served in the 2003 Iraq war. We also assessed the possible reasons for associations between medical trade and mental ill health in terms of medical and combat traumatic experiences, unit cohesion and problems at home on return from deployment, after adjusting for socio-demographic factors.

Methods

The data presented here were collected during the first stage of a cohort study to compare the mental and physical health of UK Armed Forces personnel, who deployed on Operation TELIC 1 with individuals who did not deploy but who were in service at the time (designated the Era group). Details of the sampling method, participants, response rates and questionnaires are given in a previous publication.¹⁴ A total of 4722 regular and reserve personnel in the TELIC 1 group and 5550 in the Era group completed a questionnaire about their experiences during and after deployment, an adjusted response rate of 61%. Of the Era group, 1145 people reported having

*In this article, UK military medical personnel including doctors, nurses and medical support staff are referred to collectively as medics.

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served on subsequent TELIC deployments. The study received approval from King's College Hospital local research ethics committee and the Ministry of Defence (Navy) personnel research ethics committee.

For this article, we include those in the TELIC 1 sample plus those in the Era group who served on later TELIC operations (TELIC 2–6). From responses to the questionnaire we identified 526 participants whose main duty during TELIC operations was medical or welfare. We were able to verify from personnel and deployment databases held by the Defence Analytical Services Agency (DASA) that 479 had a medical role. We excluded 43 individuals from this analysis because we were unable to confirm their role and four people were reassigned to the 'other main duty' group because their roles were not medical. Personnel endorsing a medical role could be doctors, nurses, medical assistants, medical technicians, aero-medical evacuation staff, medical administration staff and other professions allied to medicine. The comparison group were 5345 respondents who endorsed any other main duty during TELIC operations. These duties were: combat, logistics/supply, aircrew, engineering, catering/chef, intelligence, military police, flight operations, administrative, musician, warfare branch and Air Force protection.

The following measures of current health were included in the questionnaire: the 12 item General Health Questionnaire (GHQ-12) as a measure of psychological distress; the civilian version of the post-traumatic stress disorder (PTSD) checklist (PCL-C); the Chalder fatigue scale; 53 somatic symptoms as used in our previous study of Gulf War veterans; the World Health Organization Alcohol Use Disorders Identification Test (WHO AUDIT).^{15–18} Cases for each measure were defined as those with a score of: 4 or more for GHQ-12; 4 or more for the fatigue scale; 50 or more for the PCL-C; 18 or more physical symptoms; 16 or more on the AUDIT scale, corresponding to 'high levels of alcohol problems' ('heavy drinking').¹⁸ In addition, participants were asked to provide military and social demographic details and information about their preparedness for, and experiences during and after their deployment.

Analysis

Odds Ratios (OR) with 95% confidence limits (95% CI) were calculated to assess the association between role in theatre and health outcomes using logistic regression to control for confounders and to adjust for potentially traumatic experiences, morale and unit cohesion, and problems on return from deployment. We checked, a priori, for effect modification by enlistment status (regular or reserve), because of possible qualitative differences between regular and reserve medical professionals. Model adequacy was tested using a specification test and goodness of fit with the Hosmer–Lemeshow test. A quadratic term was included for the continuous variable (age) when model inadequacy was indicated. Where model adequacy was not improved by including quadratic or cubic terms for age plausible interactions were investigated. Analyses were performed using STATA 9.2. Appropriate survey commands (svy) were used to account for the over sampling of reservists in the original sample.

Results

A total of 5867 responders who deployed on Operation TELIC 1–6 were included in the analysis. We found no interaction between role and enlistment type (regular or reserve) for any health outcome. Medics were older, of higher rank and educational status than non-medical personnel. A higher proportion of medics was female, in the army, belonged to

Table 1 Socio-demographic and military characteristics of medics compared to all other duties in theatre, during TELIC (1–6) operations

	Medics (n = 479) (%)	All other duties (n = 5345) (%)	P ^a
Service			0.0067
Royal Navy	60 (14)	774 (15)	
Army	357 (72)	3549 (66)	
RAF	62 (13)	1022 (20)	
Rank			<0.0001
Officer	211 (41)	798 (15)	
Non commissioned officer	235 (52)	3411 (64)	
Other	32 (7)	1087 (21)	
Enlistment status			<0.0001
Regular	267 (72)	4623 (93)	
Medically downgraded (Jan 2003)	23 (6)	309 (6)	0.9
No previous deployment	255 (47)	1718 (30)	<0.0001
Age (years)			<0.0001
<29	129 (30)	2210 (43)	
30–34	95 (22)	1193 (23)	
35–39	84 (18)	1033 (19)	
≥40	171 (30)	909 (16)	
Sex			<0.0001
Male	300 (65)	4994 (94)	
Marital status			0.06
Married/cohabiting	344 (72)	4020 (76)	
Single or divorced	133 (28)	1303 (25)	
Educational status			<0.0001
No qualifications	18 (4)	434 (9)	
O level or equivalent	118 (31)	2328 (46)	
A level or equivalent	89 (22)	1530 (30)	
Degree or higher	196 (43)	766 (15)	

Percentages are weighted to account for sampling fractions.
a: Pearson's Chi squared test with Rao and Scott second order correction.

Mean age at completion of questionnaire: Medic = 35.4 (SD 7.6), All other roles = 32.1 (7.5)

the reserve services, and had not experienced deployment before the Iraq war (table 1).

The experiences of personnel during and after deployment are shown in table 2. It was less common for medics to have been deployed with their parent unit, to have felt well informed about what was going on, for their seniors to have been interested in what they thought or did, or to be able to go to most people in their unit if they had a problem. Fewer medics reported combat exposures but they more commonly saw people wounded or killed, handled bodies and gave aid to the wounded. Approximately two-thirds of personnel, irrespective of role, experienced diarrhoea and/or vomiting during deployment but medics more often reported that they required intravenous fluids, and said their symptoms prevented them doing normal duties. Medics more often reported spending at least one night under medical care. They were more commonly evacuated by air from Iraq to the UK for medical reasons.

On return from deployment, more medics reported having major problems, with fewer feeling well supported by the military. More medics reported that other people did not understand what they had been through.

Psychological distress and multiple physical symptoms, but not PCL-C caseness or 'heavy drinking', were positively associated with medical trade after adjustment for confounders (model 1, table 3). Addition of a variable for 'overstretch' (up to 12 months/more than 12 months deployed in last three years) to model 1 had no effect for any health outcome (results not shown). The models for fatigue showed inadequacy, which was not improved by adding quadratic or cubic terms for the age variable. An interaction between trade and sex was thought

Table 2 Experiences during and after Operation TELIC (1–6)

	Medics (%)	All other duties (%)	P
Comradeship, unit cohesion and preparedness			
Felt comradeship with others in unit	386/474 (81)	4179/5097(82)	0.573
Could go to most people in unit with a personal problem	212/475 (44)	2500/5096 (49)	0.030
Seniors interested in what I thought and did	227/472 (50)	2828/5097 (56)	0.014
Felt well informed about what was going on	179/475 (40)	2833/5101 (56)	<0.0001
Deployed with parent unit	299/476 (55)	3547/5071 (70)	<0.0001
Work in theatre matched trade experiences and ability	373/469 (80)	3832/4697 (83)	0.156
Potentially adverse combat experiences in theatre			
Time in forward area in close contact with enemy	240/462 (53)	2908/4989 (58)	0.035
Came under small arms fire	107/479 (24)	1826/5344 (34)	<0.0001
Came under mortar/scud/artillery fire	263/479 (55)	2691/5344 (50)	0.050
Experienced landmine strike	12/479 (2.6)	226/5344 (4.3)	0.082
Experienced hostility from civilians	196/479 (42)	2399/5344 (45)	0.239
Discharged personal weapon in direct combat	4/471 (1.0)	867/5073 (18)	<0.0001
Thought might be killed	297/472 (62)	2938/5079 (57)	0.084
Potentially adverse medical experiences in theatre			
Saw personnel wounded or killed	349/479 (72)	2216/5344 (42)	<0.0001
Handled bodies	253/478 (52)	606/5344 (12)	<0.0001
Gave aid to wounded	386/479 (79)	672/5344 (13)	<0.0001
Adverse medical events in theatre			
Spent one or more nights under medical care during deployment	114/435 (24)	700/4037 (17)	0.0004
Had diarrhoea and/or vomiting during deployment	291/439 (64)	2573/4082 (63)	0.69
Needed intravenous fluids because of diarrhoea & vomiting	57/354 (16)	279/3368 (8)	<0.0001
Symptoms of diarrhoea and/or vomiting prevent normal duties	154/353 (41)	1155/3357 (34)	0.0087
Medically evacuated from theatre	30/476 (5.4)	150/5078 (2.8)	0.001
Post deployment experience			
Had major problems on return	140/454 (28)	1052/4960 (20)	0.0001
Felt well supported by military	252/461 (56)	3121/4947 (64)	0.0017
Had difficulty adjusting to being back home	172/466 (35)	1726/4989 (33)	0.638
Proud of contribution made in TELIC	420/470 (88)	4433/4994 (89)	0.638
People didn't understand what been through	347/463 (73)	3369/4970 (67)	0.013
Didn't want to talk to family about experiences	184/463 (40)	1885/4984 (38)	0.360
Frustrated at time taken to return home	161/460 (38)	2343/4967 (48)	0.0002
Likely continue service	294/458 (62)	2983/4770 (62)	0.902

Percentages weighted to account for sampling fractions. Denominators vary because not all participants completed the relevant questions

Table 3 The association between medical trade and psychological ill health adjusted for confounders and possible explanatory variables

	Medics n = 479 (%)	All other roles n = 5345 (%)	Adj. OR ^a (95% CI)	Adj. OR ^b (95% CI)	Adj. OR ^c (95% CI)	Adj. OR ^d (95% CI)	Adj. OR ^e (95% CI)
GHQ-12	120/475 (25)	1022/5242 (19)	1.30 (1.00–1.70)	1.14 (0.87–1.50)	1.30 (0.98–1.71)	1.05 (0.76–1.44)	1.07 (0.78–1.46)
PTSD (PCL)	19/472 (4)	219/5223 (4)	1.35 (0.77–2.38)	1.12 (0.63–2.02)	1.48 (0.81–2.70)	0.68 (0.35–1.33)	1.16 (0.60–2.24)
Multiple physical symptoms	73/479 (15)	612/5345 (11)	1.65 (1.20–2.27)	1.33 (0.95–1.87)	1.56 (1.12–2.19)	0.93 (0.64–1.36)	1.38 (0.95–2.00)
AUDIT heavy	57/474 (13)	897/5251 (18)	1.13 (0.79–1.62)	1.05 (0.72–1.52)	1.06 (0.73–1.55)	0.83 (0.57–1.22)	0.95 (0.65–1.40)
Fatigue male	114/297 (37)	1574/4879 (32)	1.38 (1.05–1.81)	1.19 (0.89–1.59)	1.34 (1.01–1.77)	1.05 (0.77–1.42)	1.17 (0.88–1.57)
Fatigue female	57/178 (31)	143/338 (41)	0.57 (0.35–0.92)	0.45 (0.26–0.79)	0.52 (0.30–0.90)	0.33 (0.15–0.73)	0.48 (0.27–0.85)

a: Model 1 adjusted for the following confounders: rank, age, (age²), sex, education, service, enlistment type, marital status, previously deployed

b: Model 2 adjusted for model 1 variables and unit cohesion and preparedness: seniors interested, well informed, comradeship, go most people with problems, deployed with parent, work matched trade and experience

c: Model 3 adjusted for model 1 variables and traumatic combat experiences: discharged weapon, small arms fire, forward area, thought might be killed, mortar attack, landmine, civilian hostility

d: Model 4 adjusted for model 1 variables and traumatic medical experiences: aided wounded, handled bodies, see people wounded/killed

e: Model 5 adjusted for model 1 variables and post deployment experience: major problems, military not supportive, people didn't understand, difficulty adjusting, didn't want to talk family/friends, frustrated by time to come home

to be the most likely problem. We found a significant interaction ($P=0.002$) between sex and trade for fatigue, thus we report results for fatigue stratified by sex in table 3. The separate models for males and females were adequate. Medical trade was positively associated with fatigue symptoms for men but negatively associated for women (table 3).

All associations were of small effect size except fatigue in women, which was moderate.

Adjustment for combat related traumatic experiences in theatre (model 3) did not modify the level of associations compared with adjustment for confounders only (table 3). In contrast, traumatic medical experiences (aiding the

Table 4 The association between medical trade and psychological distress reported separately for 'aided the wounded'

	Medics n = 479 (%)	All other roles n = 5345 (%)	Adj. OR ^a (95% CI)	Adj. OR ^b (95% CI)	Adj. OR ^c (95% CI)	Adj. OR ^d (95% CI)
GHQ-12	120/475 (25)	1022/5242 (19)	1.30 (1.0–1.70)	1.14 (0.87–1.50)	1.30 (0.98–1.71)	1.07 (0.78–1.46)
GHQ-12 aided wounded	93/383 (23)	168/659 (25)	0.73 (0.47–1.13)	0.66 (0.42–1.05)	0.87 (0.53–1.42)	0.73 (0.44–1.23)
GHQ-12 did not aid wounded	27/91 (29)	852/4578 (18)	2.02 (1.23–3.32)	1.76 (1.10–2.90)	2.33 (1.40–3.91)	1.88 (1.05–3.38)

a: Adjusted for socio-demographics: rank, age (age²), sex, education, service, enlistment type, marital status, previously deployed

b: Adjusted for socio-demographics + unit cohesion and preparedness: seniors interested, well informed, comradeship, go most people with problems, deployed with parent, work matched trade and experience

c: Adjusted for socio-demographics + traumatic experiences (combat): discharged weapon, small arms fire, forward area, thought might be killed, mortar attack, landmine, civilian hostility

d: Adjusted for socio-demographics + post deployment experience: major problems, military not supportive, people didn't understand, difficulty adjusting, didn't want to talk family/friends, frustrated by time to come home

wounded, seeing people wounded or killed, handling bodies) (model 4) were a plausible explanation for the associations observed after adjustment for confounders only, as indicated by the reduction in odds ratio to the null after adjustment. Likewise, cohesion and preparedness (model 2), and post-deployment experiences (model 5) were also able to explain the associations. Of note, the association of fatigue with medical trade in women was not modified by any adjustments.

In the course of exploring possible interpretations of the results we observed a significant interaction ($P=0.003$) between aiding the wounded and trade for psychological distress. Among medics, psychological distress was less likely in those who aided the wounded (adjusted OR 0.62 95% CI 0.35–1.08), although this difference was of only borderline statistical significance, whereas for other trades psychological distress was more likely in those who aided the wounded (adjusted OR 1.47 95% CI 1.20–1.81). Medics who did not aid the wounded had an increased OR of reporting psychological distress compared to other trades who did not aid the wounded (table 4). Medics who did not aid the wounded did not differ in social or military demographic characteristics from other medics. Personnel from other trades who gave aid to the wounded were younger, more often in the army and to be in combat units but adjusting for combat role did not account for the association between psychological distress and aiding the wounded (results not shown).

Discussion

Medics were more likely to report psychological distress, multiple physical symptoms and, if men, fatigue than other deployed Service personnel. PTSD was not associated with medical trade and nor was 'heavy drinking'. The association of mental ill health with a medical role was not the consequence of a larger proportion of reservists in this group. This finding was contrary to the expectation since we recently reported that deployed reservists had a higher prevalence of all health outcomes measured than regular personnel.¹² Medical traumatic experiences, but not combat traumatic experiences, explained the associations with psychological ill health. Likewise, cohesion and preparedness and post-deployment experiences can explain the associations. We were able to demonstrate that medics made a greater use of medical facilities than other trades.

Our study provides an evidence of a small increase in some psychological symptoms in medics compared to other military trades, which only partially explains the greater level of utilization of medical resources evidenced in our study and also in health data routinely collected by the military. Our results suggest that medics tended to use medical facilities

over and above the differences in symptoms reported, especially in relation to spending nights under medical care, medical evacuation from theatre, and use of intravenous fluids because of diarrhoea and vomiting. A large gastroenteritis outbreak occurred in UK deployed forces between 28 March 2003 and 3 May 2003 which disproportionately affected medics.¹⁹ However, despite their increased need for intravenous fluids, there was no difference in reported episodes of gastroenteritis between medics and others in our study.

Female health workers, in most occupational groups, in the National Health Service (NHS) have higher levels of fatigue than their male counterparts.²⁰ This is contrary to the findings in this study, possibly explained by differences in the duties undertaken by male and female military medics not found in the NHS. Significantly more male medics 'spent time in a forward area in close contact with the enemy' where duties would include frequent movement of heavy equipment as units advanced, whereas female medics were more often deployed to the static field hospital.

What accounts for differences in psychological symptoms?

Traumatic experiences during deployment

Previous reports have suggested that medical personnel experience higher rates of PTSD. Emergency room personnel, intensive care unit nurses and ambulance service personnel have been reported as being at increased risk of PTSD as a result of their job experiences, with a substantial proportion of ambulance workers meeting GHQ case criteria for psychiatric symptoms.^{21–23} Carson and colleagues reported that in Vietnam nurse veterans witnessing death and serious injury to others contributed to PTSD.¹ However, a study of US health care providers deployed in Iraq and Afghanistan found that frequent exposure to injured or dead personnel did not increase the risk of either PTSD or depression.⁵ We did not find a difference between medical and other trades for PTSD, but we did find strong evidence that medical traumatic experiences such as seeing personnel wounded or killed, giving aid to wounded and handling bodies explained the excess in multiple physical symptoms and fatigue in males. Aiding the wounded was associated with psychological distress in both medics and other trades. For medics, whose training and experience prepare them for handling casualties, not fulfilling that role may be associated with increased psychological distress, whereas for personnel in other trades exposure to casualty handling increases psychological distress, an effect not accounted for by combat role.

Cohesion and leadership

Our study also indicated that factors such as cohesion, leadership and preparedness could be possible contributors to an excess of psychological symptoms. Medics expressed more negative sentiments regarding cohesion and leadership. Medics, particularly regulars, were less likely to report that they deployed with their parent unit. We found evidence that lack of unit cohesion and negative views about leadership are able to explain the excess reporting of psychological distress, multiple physical symptoms and fatigue in males. We are not aware of other studies that have covered these factors in military medical personnel, but unit cohesion has been found to be the most important motivating factor for combat soldiers, to influence strain experienced by soldiers on operation, to be the most powerful predictor of psychiatric symptoms, and to attenuate the impact of life experiences on PTSD.^{24–27} Studies in civilian health workers have shown that workload pressures are associated with psychological ill health in doctors and nurses and that psychological distress is caused by low involvement in decision making and poor social support at work.^{8,28}

Post-deployment experiences

Another factor that explained the differences in this study was post-deployment experience. Medics reported more major problems on return, and more claimed that people did not understand what they have been through and did not feel well supported by the military. The duties undertaken by doctors and nurses, regulars and reserves, are similar whether deployed or at home, although the conditions in which they work are very different. Many will return from deployment to work in NHS hospitals, or MoD hospital units within NHS hospitals, where the military support network is less accessible.

Strengths and limitations

This is the largest study of the psychological health of military medical personnel based on a representative sample of the deployed British military population. It directly compares psychological ill health between medics and other trades, unlike other studies which rely for comparisons on other reports using different methods.⁵ Although the largest study of this nature, the statistical power to analyse PTSD symptoms was low, but it was sufficiently high for our other outcomes of psychological health. Our analysis included all medical personnel but it is possible that associations may differ between the various health professions as shown for civilian health workers.^{29–31}

Although the peacetime roles of military doctors and nurses are comparable to those in the civilian health service and their roles on deployment, particularly if deployed to the field hospital are not dissimilar, the role of deployed military medical assistants may differ markedly from their peacetime role. Some military medical assistants are effectively well trained paramedics with additional schooling in basic nursing care, prescribing and medical administration, whereas others have only rudimentary medical training and little experience other than administrative medical centre work. On deployment they may work as part of a medical team, headed by a doctor, but at times they will be called upon to practice independently with only limited and sporadic access to medical supervision. The effect of this on psychological ill health could not be considered in our study, but the great majority of medics felt that their work in theatre matched their trade experience and ability.

This study is cross sectional and therefore it is not possible to determine the direction of causation for the associations we report. Although there is potential for recall bias, we believe it

unlikely that there would be a difference in recall, between medics and other trades, of the exposures used in the analysis.

Implication and conclusions

Our study has shown that there are small associations between medical trade and psychological ill health and that there is greater utilization of health resources by medics that could be explained by easier access or to a greater level of dissatisfaction. Our study provides important pointers as to how to address the excess of psychological ill health. We have demonstrated that, in comparison to other trades, among medics there was a feeling of poor group cohesion, a perception that they were poorly informed and, to some extent that their superiors were not interested in them. Combat units typically spend up to a year preparing and training together for an operational deployment whereas a medical group is assembled only weeks before deployment and, in recent years, has only two weeks pre-operational training as a unit, factors which are likely to impair effective communication and make leadership more of a challenge. Good team relationships, thorough preparation and high morale have been shown to protect against serious adverse reactions to potentially traumatic experiences.³²

The situation on the ground in Iraq has undergone change since data collection for this study ended and many medics have been re-deployed to Iraq, some on a number of occasions. A follow-up study is necessary to assess whether psychological health is deteriorating in deployed medics.

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Conflict of interest: S.W. is an Honorary Civilian Consultant Advisor in Psychiatry to the British Army (unpaid). N.G. is a full-time active service medical officer and N.J. is a full-time reserve member of Defence Medical Services seconded to King's College; although paid by the Ministry of Defence they were not directed in any way by the Ministry in relation to this paper. All other authors declare they have no conflict of interest.

Key points

- Operational commitments are being met by repeated deployment of medical personnel and by the use of large numbers of reserve 'medics'. Reservist status has previously been shown to be associated with poorer health outcomes for deployed personnel.
- The small excess of mental ill health found in deployed medical personnel compared to other trades may be explained by: poorer group cohesion and leadership; exposure to wounded casualties; and post deployment experiences.
- The excess is not attributable to the larger proportion of reservists in medical roles.
- Measures to increase group cohesion and effective leadership may improve the mental health of deployed medical personnel.
- A need for improved access to military support networks is indicated for medical personnel who return from deployment to work in NHS hospitals.

References

- 1 Carson MA, Paulus LA, Lasko NB, et al. Psychophysiological assessment of posttraumatic stress disorder in Vietnam nurse veterans who witnessed injury or death. *J Consult Clin Psychol* 2000;68:890–7.
- 2 Burden JIF, Jeffery SMT, Leach AJ. The psychological morbidity of military healthcare workers. *J R Nav Med Serv* 2005;91:37–42.
- 3 Akbayrak N, Oflaz F, Aslan O, et al. Post-traumatic stress disorder symptoms among military health professionals in Turkey. *Mil Med* 2005;170:125–9.
- 4 Lubin G, Sids C, Vishne T, et al. Acute stress disorder and post-traumatic stress disorder among medical personnel in Judea and Samaria areas in the years 2000–2003. *Mil Med* 2007;172:376–8.
- 5 Grieger TA, Kolkow TT, Spira JL, Morse JS. Post-traumatic stress disorder and depression in health care providers returning from deployment to Iraq and Afghanistan. *Mil Med* 2007;172:451–5.
- 6 Jones N, Greenberg N, Fear NT, et al. The operational mental health consequences of deployment to Iraq for UK Forces. *J R Army Med Corps* 2008.
- 7 Turner MA, Kiernan MD, McKechnie AG, et al. Acute military psychiatric casualties from the war in Iraq. *Br J Psychiatry* 2005;186:476–9.
- 8 Michie S, Williams S. Reducing work related psychological ill health and sickness absence: a systematic literature review. *Occup Environ Med* 2003;60:3–9.
- 9 Taylor C, Graham J, Potts HW, et al. Changes in mental health of UK hospital consultants since the mid-1990s. *Lancet* 2005;366:742–4.
- 10 Burbeck R, Coomber S, Robinson SM, Todd C. Occupational stress in consultants in accident and emergency medicine: a national survey of levels of stress at work. *Emerg Med J* 2002;19:234–8.
- 11 National Audit Office. Recruitment and retention in the armed forces. London: TSO, 3-11-2006.
- 12 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.
- 13 Rona RJ, Fear NT, Hull LM, et al. Mental health consequences of overstretch in the UK armed forces: first phase of a cohort study.[see comment]. *Br Med J* 2007;335:603.
- 14 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.
- 15 Goldberg D, Williams P. *A users guide to the general health questionnaire*. Windsor, UK: NFER-Nelson, 1988.
- 16 Blanchard EB, JonesAlexander J, Buckley TC, Forneris CA. Psychometric properties of the PTSD checklist (PCL). *Behav Res Ther* 1996;34:669–73.
- 17 Chalder T, Berelowitz G, Pawlikowska T, et al. Development of a fatigue scale. *J Psychosom Res* 1993;37:147–53.
- 18 Babor TF, Higgins-Biddle JC, Saunders JB, Monteiro MG. *The alcohol use disorders test: guidelines for use in primary care*, 2nd edn. Geneva: World Health Organization, 2001.
- 19 Bailey MS, Boos CJ, Vautier G, et al. Gastroenteritis outbreak in British troops, Iraq. *Emerg Infect Dis* 2005;11:1625–8.
- 20 Hardy GE, Shapiro DA, Borrill CS. Fatigue in the workforce of national health service trusts: levels of symptomatology and links with minor psychiatric disorder, demographic, occupational and work role factors. *J Psychosom Res* 1997;43:83–92.
- 21 Laposa JM, Alden LE. Posttraumatic stress disorder in the emergency room: exploration of a cognitive model. *Behav Res Ther* 2003;41:49–65.
- 22 Clohessy S, Ehlers A. PTSD symptoms, response to intrusive memories and coping in ambulance service workers. *Br J Clin Psychol* 1999;38:251–65.
- 23 Mealer ML, Shelton A, Berg B, et al. Increased prevalence of post-traumatic stress disorder symptoms in critical care nurses. *Am J Respir Crit Care Med* 2007;175:693–7.
- 24 Rielly RJ. Confronting the tiger: small unit cohesion in battle. *Mil Rev* 2000;61–65.
- 25 Farley K, Veitch J. Measuring morale, cohesion, and confidence in leadership: what are the implications for leaders. *The Canadian Journal of Police & Security Services* 2003;1:353–64.
- 26 Orsillo SM, Roemer L, Litz BT, et al. Psychiatric symptomatology associated with contemporary peacekeeping: an examination of post-mission functioning among peacekeepers in Somalia. *J Trauma Stress* 1998;11:611–25.
- 27 Brailey K, Vasterling JJ, Proctor SP, et al. PTSD symptoms, life events, and unit cohesion in US soldiers: baseline findings from the neurocognition deployment health study. *J Trauma Stress* 2007;20:495–503.
- 28 Tyler P, Cushway D. Stress in nurses – the effects of coping and social support. *Stress Med* 1995;11:243–51.
- 29 Pattani S, Constantinovici N, Williams S. Who retires early from the NHS because of ill health and what does it cost? A national cross sectional study. *Br Med J* 2001;322:208–9.
- 30 Wall TD, Bolden RI, Borrill CS, et al. Minor psychiatric disorder in NHS trust staff: occupational and gender differences. *Br J Psychiatry* 1997;171:519–23.
- 31 Calnan M, Wainwright D, Forsythe M, et al. Mental health and stress in the workplace: the case of general practice in the UK. *Soc Sci Med* 2001;52:499–507.
- 32 Alexander DA, Wells A. Reactions of police officers to body-handling after a major disaster – a before-and-after comparison. *Br J Psychiatry* 1991;159:547–55.

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