

# Mental health and health service use among post-national service veterans: results from the 2007 Adult Psychiatric Morbidity Survey of England

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**Background.** There is concern surrounding the psychological health and uptake of treatment services among veterans of the UK Armed Forces.

**Method.** Data from a cross-sectional, nationally representative sample were used to compare health outcomes and treatment seeking among 257 post-national service veterans aged 16–64 years and 504 age and sex frequency-matched non-veterans living in the community in England. Early leavers (<4 years service) were compared with longer serving veterans.

**Results.** Male veterans reported more childhood adversity and were more likely to have experienced a major trauma in adulthood than non-veterans. There was no association between any measure of mental health and veteran status in males, except reporting more violent behaviours [adjusted odds ratio (aOR) 1.44, 95% confidence interval (CI) 1.01–2.06]. In females, a significant association was found between veteran status and ever having suicidal thoughts (aOR 2.82, 95% CI 1.13–7.03). No differences in treatment-seeking behaviour were identified between veterans and non-veterans with any mental disorder. Early service leavers were more likely to be heavy drinkers (aOR 4.16, 95% CI 1.08–16.00), to have had suicidal thoughts (aOR 2.37, 95% CI 1.21–4.66) and to have self-harmed (aOR 12.36, 95% CI 1.61–94.68) than longer serving veterans.

**Conclusions.** The findings of this study do not suggest that being a veteran is associated with adversity in terms of mental health, social disadvantage or reluctance to seek treatment compared with the general population. Some evidence implies that early service leavers may experience more mental health problems than longer-serving veterans.

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**Key words:** Mental health, military, post-national service, treatment-seeking, veteran.

## Introduction

There is considerable interest surrounding the mental health of veterans, defined here as individuals who have served, but are no longer serving, in the armed forces. It has been reported that those who have served in active deployments are at increased risk of combat-related psychiatric injury (Solomon *et al.* 1994; Kang *et al.* 2003; Hoge *et al.* 2004; Dohrenwend *et al.* 2006; Hotopf *et al.* 2006; Sundin *et al.* 2009). However, little is

known about the impact of military service on help-seeking behaviour for mental health-related problems. In the context of a culture in which stoicism and resilience are valued, those who have served in the military are likely to be reluctant to seek help for mental health problems (Hoge *et al.* 2004). Given the impact of stigma on help-seeking for a mental health problem within the general population (Thornicroft, 2006), it is important to examine whether veterans have difficulties over and above the rest of the population and beyond any pre-service vulnerabilities (Iversen *et al.* 2007). Veterans who left the services early (<4 years service) may be at greater risk of adversity (Iversen *et al.* 2005*b*; Jones *et al.* 2009), since

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4 years is the minimum engagement period in the Army (British Army, 2009) and leaving before this time is likely to be due to discharge on medical, administrative or disciplinary grounds.

Mental health problems among veterans have been associated with functional impairment, for example, with regard to employment (Kessler, 2000; Iversen *et al.* 2005*b*), relationships, intimacy, marital satisfaction and family stability (Solomon *et al.* 1992; Taft *et al.* 2008). It is not known if these outcomes are different from civilians with the same mental health problems, due to the lack of research incorporating general population controls. The present study takes advantage of a nationally representative survey (McManus *et al.* 2009) and compares veterans with a comparable non-veteran sample.

This study investigates the following hypotheses:

- (1) Being a veteran is a risk factor for mental health problems and behavioural difficulties.
- (2) Veterans are more likely to have experienced adversity, marital instability and poorer social support than non-veterans.
- (3) Symptomatic veterans are less likely to seek treatment than symptomatic non-veterans.
- (4) Leaving the services prematurely (<4 years) adversely affects health and adversity compared with those who served for longer.

## Methods

### Data collection and sample

Analyses were carried out using data collected for the 2007 Adult Psychiatric Morbidity Survey (APMS), a nationally representative sample of community-dwelling adults in England, for which fieldwork was carried out between October 2006 and December 2007 (McManus *et al.* 2009). The first survey stage was carried out by interview, although sensitive questions (e.g. those concerning self-harm) were self-completed. In total, 7461 adults responded to the first stage of the survey, corresponding to a response rate of 57%.

Exclusions from the original sample ( $n = 7461$ ) were proxy interviews, veterans reporting improbable ages at the time of service (such as joining before age 16 or after age 55 years), respondents who were currently serving, veterans who served before compulsory national service was terminated in 1960 and non-veterans of comparable age ( $\geq 65$  years). This reduced the overall sample to 5480 (74% of total), of which 257 (4.7%) were post-national service veterans.

Veterans differed from non-veterans in that veterans were older and predominantly male. Since mental health problems vary by age and sex (McManus *et al.* 2009), a frequency-matched comparison group

was generated by sampling appropriate proportions in each age and sex group. The final sample included 257 veterans and 504 age and sex frequency-matched non-veterans.

### Demographic factors

Information was collected on age, sex, marital status, socio-economic class (Office for National Statistics, 2009), ethnic group and educational qualifications. Childhood adversity was assessed from 20 items in line with a previous study of UK military personnel (Iversen *et al.* 2007) (including, for example: 'Before age 16 did you ever experience violence in the home?'). Responses were grouped into three categories for analysis (0, 1 and 2+ factors). Perceived social support was assessed from seven items, which followed the stem statement: 'There are people I know amongst my family and friends who ...' (for example, '... make me feel loved'). Responses were scored from 1 to 3, summed and divided into three groups in line with previous research (Brugha *et al.* 2003): no lack (21), moderate lack (18–20) and severe lack ( $\leq 17$ ) of social support. Financial problems were identified from three questions, including whether they were late on debt repayments or had had to borrow money. A binary variable ('none' or 'at least one problem') was created for analysis. Participants were asked if they had ever been homeless and whether or not they had experienced trauma in adulthood. Trauma was defined as an event since age 16 that had endangered participant's lives or the lives of someone close or had put them at serious risk, such as a natural disaster, seeing people killed or being raped. Respondents who reported serving in the armed forces were asked if the trauma was military-related.

### Mental health outcomes

Outcome measures included any neurotic disorder, measured using the Revised Clinical Interview Schedule (Lewis *et al.* 1992), 'heavy alcohol use', using the World Health Organization's Alcohol Use Disorders Identification Test (AUDIT) and a cut-off score of 16 (Babor *et al.* 2001; Fear *et al.* 2007), alcohol dependence (in those with an AUDIT score of  $\geq 10$ ) using the Severity of Alcohol Dependence Questionnaire (SAD-Q) and a cut-off score of 3 (Stockwell *et al.* 1983), post-traumatic stress disorder (PTSD) using the Trauma Screening Questionnaire (TSQ) and a cut-off score of 6 (Brewin *et al.* 2002), drug dependence, (for those currently using a drug) from the endorsement of any of five questions about their drug use regarding, for example, the ability to abstain, withdrawal and

tolerance. A binary variable indicating the presence of any of these mental health outcomes was created.

Self-harm (suicidal thoughts, attempts and self-harm) was assessed by both interview and self-completion; only the latter data are reported as it was thought likely to be more accurate (Bowling, 2005). Violent behaviour was examined from six APMS questions relating to the identification of personality disorder (McManus *et al.* 2009) (for example: 'Do you ever hit people or throw things when you get angry?'). Responses were divided into three categories (none, one and two or more violent behaviours).

### *Treatment-seeking behaviour*

For each outcome of interest, treatment seeking was analysed in participants identified with an outcome, although due to small numbers only the data for those with any mental disorder are presented. Information included whether they had received medication, counselling, therapy or any health care for mental health or emotional reasons in the last year.

### *Length of military service*

For veterans, length of military service was calculated as the difference between the first and last year they reported serving. Demographic characteristics, mental health outcomes and treatment-seeking behaviour was compared in early leavers (those who served for <4 years) and longer serving veterans ( $\geq 4$  years of service). This represents the minimum period of engagement for the Army, as the Army is the largest service (Defence Analytical Services and Advice, 2009) and this approach has been used elsewhere (Rona *et al.* 2007). Data on length of service was not available for 24 veterans due to incomplete data. Length of time since leaving the services was calculated by subtracting the year left services from the APMS questionnaire year (2007).

### *Statistical analysis*

Pearson's  $\chi^2$  tests with Rao & Scott second-order corrections for survey design and logistic regressions were used to assess associations with veteran status and early-leaver status using *p* values, odd ratios (OR) and 95% confidence intervals (CI). Violent behaviour and length of time since leaving the services were analysed using ordinal logistic regression. These analyses were carried out separately by sex, except for treatment seeking due to small numbers. Confounding factors were accounted for with logistic regression modelling using two methods: (1) for significant

associations only, models were adjusted for factors associated both with being a veteran and with the outcome being analysed, not considered to be on the causal pathway; (2) for all analyses, adjustments were made for age, sex (where appropriate), education, marital status and socio-economic class. No notable differences in effect sizes were observed with method 2; thus, unadjusted and minimally adjusted OR (method 1) are presented.

All analyses account for weighting, clustering and stratification inherent in the survey design. Weighting accounted for non-response based on the difference between the sample and the mid-census estimates (McManus *et al.* 2009), clusters were postcode sectors and were stratified on the basis of socio-economic status within regional areas (McManus *et al.* 2009). Analyses were carried out using Stata (version MP10.1; Stata Corp., USA).

## **Results**

### *Sociodemographic characteristics*

Veterans accounted for 4.7% (257/5480) of the sample, of which 85.2% were male. The median age for male and female post-national service veterans was 49 years [interquartile range (IQR) 40–59] and 46 years (IQR 39–58) respectively. For non-veterans, median age was 47 years (IQR 39–58) and 45 years (IQR 38–56) respectively. Males served for longer on average than females [median 6 years (IQR 2–12) compared with 3 years (IQR 1–5)]. Male veterans were more likely than non-veterans to be married or cohabiting, to report experiencing childhood adversity and to have experienced major trauma since age 16 years (Table 1). Of 102 male veterans who reported experiencing a major trauma since age 16 years, 34% reported that this was related to a military experience. There were no differences between female veterans and non-veterans with regard to any demographic characteristics measured.

### *Mental health and behavioural outcomes*

There was no difference in the prevalence of any mental disorders examined between veterans and non-veterans (Table 2) or in self-harm or suicidal behaviours for males according to veteran status. However, male veterans did report more violent behaviours than non-veterans. This association remained significant after adjustment for childhood adversity [OR (ordinal regression) 1.44, 95% CI 1.01–2.06]. Female veterans were more likely to report ever experiencing suicidal thoughts than non-veterans (Table 2).

**Table 1.** Comparison of demographic factors, social support, experience of trauma and childhood adversity between veterans and non-veterans by sex

	Males				<i>p</i> *	Females				<i>p</i> *
	Non-veterans ( <i>n</i> = 411)		Veterans ( <i>n</i> = 210)			Non-veterans ( <i>n</i> = 93)		Veterans ( <i>n</i> = 47)		
	<i>n</i>	%	<i>n</i>	%		<i>n</i>	%	<i>n</i>	%	
Age group (years)										
16–24	10	3.7	5	3.7		7	13.5	4	17.2	
25–34	45	12.8	21	11.8		11	11.2	6	11.8	
35–44	127	26.3	59	23.2	0.855	22	23.1	10	18.4	0.960
45–54	91	18.9	48	20.7		26	28.1	12	28.2	
55–64	138	22.5	77	25.7		27	24.1	15	24.4	
Marital status										
Married/Cohabiting	275	73.3	150	79.6		57	64.6	26	65.4	
Single	81	19.0	24	10.7	0.035	18	22.8	7	17.4	0.694
Widowed/Divorced/Separated	55	7.8	36	9.8		18	12.6	14	17.3	
Ethnic origin										
White	378	91.2	201	95.1	0.133	83	86.1	44	85.8	0.977
Non-white	32	8.9	9	4.9		10	13.9	3	14.2	
Educational qualifications										
Degree	92	24.1	45	23.5		17	22.2	9	23.3	
Teaching, HND, nursing	39	9.5	15	7.2		4	4.4	6	13.1	
A level	75	20.0	38	19.5		13	14.4	10	18.9	
GCSE or equivalent	89	22.3	65	32.4	0.080	34	35.0	13	35.2	0.261
Foreign/other	12	3.0	11	4.5		2	3.4	2	3.2	
No qualifications	98	21.2	30	12.9		22	20.5	5	6.4	
4 group socio-economic class										
Managerial and professional	148	37.7	71	36.5		20	23.5	16	34.2	
Intermediate occupations/small employers and own account workers	74	19.1	31	15.1	0.410	18	21.6	5	10.0	0.344
Routine/lower tech/lower supervisory	110	27.4	73	34.2		23	25.3	9	22.5	
Never worked/long-term unemployed	76	15.9	34	14.3		32	29.6	17	33.4	
Childhood adversity factors										
0	256	60.7	107	52.1		53	58.9	25	50.1	
1	80	20.4	40	19.7	0.037	22	22.5	13	27.6	0.689
2–11	75	18.9	63	28.2		18	18.5	9	22.3	
Perceived social support										
Severe lack ( $\leq 17$ )	50	9.8	25	9.4		4	5.1	3	6.6	
Moderate lack (18–20)	89	22.3	49	23.0	0.965	11	10.8	8	17.4	0.576
No lack (21)	271	67.9	136	67.6		78	84.1	36	76.0	
Ever experienced homelessness	20	4.3	8	4.4	0.948	5	5.3	7	12.3	0.135
Debt/money problems	55	14.4	31	13.9	0.893	14	13.3	7	14.1	0.888
Major trauma since age 16	145	36.2	102	49.4	0.006	32	37.7	19	41.3	0.722

Weighted percentages to account for survey design; frequencies are unweighted and may not add up due to missing values.  
\* Pearson's  $\chi^2$  test with Rao & Scott correction for survey data.

No difference in any specific measure of mental health or behavioural outcome was observed between veterans whose last traumatic experience was

military-related or not. Length of time since leaving the services was not associated with any of the mental health or behavioural outcomes considered.

**Table 2.** Comparison of mental health and behavioural outcomes between veterans and non-veterans by sex

Outcome	Males		<i>p</i> *	OR (95% CI)	Females		<i>p</i> *	OR (95% CI)
	Non-veterans ( <i>n</i> = 411)	Veterans ( <i>n</i> = 210)			Non-veterans ( <i>n</i> = 93)	Veterans ( <i>n</i> = 47)		
	<i>n</i> (%)	<i>n</i> (%)			<i>n</i> (%)	<i>n</i> (%)		
Severe alcohol use (AUDIT 16+)	21 (4.6)	15 (7.6)	0.169	1.72 (0.79–3.76)	4 (6.8)	0 (0.0)	0.178	N.A.
Alcohol dependence (SAD-Q 4+)	28 (6.7)	22 (10.6)	0.137	1.65 (0.85–3.20)	6 (8.3)	0 (0.0)	0.099	N.A.
Any neurotic disorder	58 (12.6)	23 (8.5)	0.141	0.64 (0.35–1.17)	25 (26.4)	14 (26.4)	0.993	1.00 (0.45–2.24)
PTSD (TSQ 6+)	9 (2.2)	7 (2.9)	0.624	1.30 (0.45–3.77)	2 (1.8)	3 (4.4)	0.331	2.50 (0.37–17.04)
Dependent on any drug	14 (3.5)	10 (5.2)	0.375	1.51 (0.60–3.78)	1 (1.0)	0 (0.0)	0.495	N.A.
Any mental disorder <sup>a</sup>	92 (21.4)	53 (23.5)	0.574	1.13 (0.74–1.70)	27 (29.8)	14 (26.4)	0.686	0.85 (0.38–1.89)
Violence <sup>b</sup>								
None	245 (59.2)	92 (45.3)			66 (72.0)	29 (65.2)		
1	106 (25.1)	73 (34.0)	0.013	1.65 (1.16–2.33)†	14 (15.0)	10 (19.9)	0.708	1.33 (0.60–2.97)†
2+	60 (15.7)	45 (20.6)			13 (13.0)	8 (14.9)		
Self-harm								
Suicidal thoughts (ever) <sup>c</sup>	61 (14.2)	39 (16.2)	0.536	1.17 (0.72–1.88)‡	21 (23.2)	20 (44.0)	0.028	2.59 (1.11–6.05)‡
Suicide attempts (ever) <sup>d</sup>	18 (4.2)	14 (6.0)	0.335	1.46 (0.69–3.09)‡	8 (10.3)	7 (11.3)	0.858	1.11 (0.34–3.65)‡
Self-harm (ever) <sup>e</sup>	21 (4.7)	10 (4.5)	0.927	0.96 (0.43–2.15)‡	5 (7.1)	7 (13.2)	0.328	1.98 (0.54–7.29)‡

OR, Odds ratio; CI, confidence intervals; AUDIT, Alcohol Use Disorders Identification Test; SAD-Q, Severity of Alcohol Dependence Questionnaire; PTSD, post-traumatic stress disorder; TSQ, Trauma Screening Questionnaire.

All percentages are weighted to account for survey design. Frequencies are unweighted but may not add up due to missing values.

<sup>a</sup> Includes severe alcohol use, alcohol dependence, any neurotic disorder, PTSD or drug dependence.

<sup>b</sup> Six possible characteristics, for example: 'Have you ever hit or thrown things at your spouse or partner? Have you been in a physical fight since age 15? Do you often have temper outbursts or get so angry that you lose control?'

<sup>c</sup> Have ever thought of taking their own life.

<sup>d</sup> Have ever made an attempt to take their life.

<sup>e</sup> Have ever deliberately harmed themselves in any way but without the intention of killing themselves.

\* Pearson's  $\chi^2$  with second-order Rao & Scott correction for survey data.

† Ordered logistic regression accounting for weighting and clustering, but not stratification.

‡ Logistic regression accounting for weighting and clustering, but not stratification.

**Table 3.** Comparison of treatment use for any mental disorder between all non-veterans and veterans

Treatment type	Any mental disorder <sup>a</sup>		<i>p</i> *
	Non-veterans ( <i>n</i> = 119)	Veterans ( <i>n</i> = 67)	
	<i>n</i> (%)	<i>n</i> (%)	
No treatment	95 (80.4)	53 (81.9)	0.808
Medication and/or counselling	24 (19.6)	14 (18.1)	
Any medication	18 (13.1)	10 (12.0)	0.828
Any therapy	14 (11.1)	4 (6.1)	0.320
Any day activity/community care service use last year	26 (21.7)	11 (15.6)	0.388
Any health care for mental/emotional reason last year	37 (26.4)	25 (33.4)	0.339
Spoken to doctor in last 2 weeks for mental/emotional reason	7 (6.4)	5 (6.3)	0.981

All percentages are weighted to account for survey design. Frequencies are unweighted but may not add up due to missing values.

<sup>a</sup> Includes any alcohol dependence, severe alcohol use, drug dependence, PTSD and any neurotic disorder.

\* Pearson's  $\chi^2$  test with Rao & Scott second-order correction for survey data.

### Treatment seeking

There was no evidence that any measure of treatment seeking differed between veterans and non-veterans (Table 3).

### Length of service

Early leavers were younger than longer serving veterans and they were more likely to be heavy drinkers (Table 4), this association remained after adjustment for age (OR 4.16, 95% CI 1.08–16.00). No differences were found in the number of violent characteristics endorsed but early leavers were more likely to report ever experiencing suicidal thoughts and ever having self-harmed (Table 4). These associations remained after adjusting for age (OR 2.37, 95% CI 1.21–4.66 and OR 12.36, 95% CI 1.61–94.68 respectively).

There was some evidence to suggest that early service leavers with any neurotic disorder and any mental disorder were less likely to seek help for a mental or emotional reason in the last 2 weeks ( $p=0.028$  and  $p=0.047$  respectively).

## Discussion

### Main findings

This is the first UK study of veterans' mental health using a population-based comparison group. The

results did not support our main hypotheses nor those anticipated from previous research or media assumptions. First, being a veteran was not associated with the health outcomes examined, although male veterans reported more violent behaviours and female veterans reported more suicidal thoughts. Second, no evidence was found to suggest that veterans differed from non-veterans in terms of social support, experiences of homelessness or money problems, but male veterans did endorse more childhood adversity factors than male non-veterans. Third, there was no evidence to support a difference in most aspects of treatment-seeking behaviour between 'ill' veterans and 'ill' non-veterans. Fourth, leaving early from the services was associated with being a heavy drinker, ever having suicidal thoughts and ever having self-harmed.

### Explanations

These data come from a representative probability sample of adults living in England; the response rate of 57% is comparable with other nationally representative studies. Results are generalizable to the community-dwelling population of England as data have been weighted to account for both sampling probability and non-response (McManus *et al.* 2009). Data were not available to compare the response rate of veterans to non-veterans. However, recent research

**Table 4.** Comparison of mental health outcomes, violence and self-harm between early service leavers (<4 years) and those who served for ≥4 years

Outcome	Not early leaver (n=135)		Early leaver (n=98)		p*	OR (95% CI)
	n	%	n	%		
Severe alcohol use (AUDIT 16+)	3	2.5	9	11.5	0.016	5.11 (1.20–21.76)
Alcohol dependence (SAD-Q 4+)	9	6.2	11	12.8	0.159	2.22 (0.71–6.93)
PTSD (TSQ 6+)	5	3.3	3	1.8	0.431	0.43 (0.11–2.65)
Dependent on any drug	5	3.9	4	4.9	0.827	1.27 (0.24–6.71)
Any neurotic disorder	15	10.4	20	13.4	0.480	1.33 (0.60–2.96)
Any mental disorder <sup>a</sup>	29	20.5	31	28.6	0.200	1.55 (0.79–3.05)
Violence						
No factors	67	49.6	43	46.8		
1 factor	46	34.9	30	29.3	0.295	1.27 (0.73–2.19)†
2–5 factors	22	15.5	25	23.9		
Self-harm						
Suicidal thoughts (ever) <sup>b</sup>	23	13.9	32	28.1	0.015	2.43 (1.23–4.78)‡
Suicide attempts (ever) <sup>c</sup>	7	4.3	11	7.3	0.334	1.74 (0.61–4.99)‡
Self-harm (ever) <sup>d</sup>	1	0.9	13	9.8	0.006	12.38 (1.56–98.2)‡

OR, Odds ratio; CI, confidence intervals; AUDIT, Alcohol Use Disorders Identification Test; SAD-Q, Severity of Alcohol Dependence Questionnaire; PTSD, post-traumatic stress disorder; TSQ, Trauma Screening Questionnaire.

All percentages are weighted to account for survey design, frequencies are unweighted.

<sup>a</sup> Severe alcohol use, alcohol dependence, any neurotic disorder, PTSD or drug dependence.

<sup>b</sup> Have ever thought of taking their own life.

<sup>c</sup> Have ever made an attempt to take their life.

<sup>d</sup> Have ever deliberately harmed themselves in any way but without the intention of killing themselves.

\* Pearson's  $\chi^2$  with second order Rao & Scott correction for survey data.

† Ordered logistic regression accounting for weighting and clustering, but not stratification.

‡ Logistic regression accounting for weighting and clustering, but not stratification.

shows that non-response rate alone is a weak predictor of non-response bias and that changes in non-response rates do not necessarily alter survey estimates (Groves, 2006). Furthermore, a comparable group of non-veterans from the same population could be identified, which has been lacking in previous studies (Orner *et al.* 1992; Fontana & Rosenheck, 1994). Many veteran studies are based on selected samples and are therefore not representative of all veterans and/or conflicts (Wessely & Jones, 2004). In contrast, the current study includes a heterogeneous group of veterans whose military role, combat and deployment experiences differ.

The lack of evidence for a difference between the veteran and non-veteran groups may be partly due to the military being a 'selected' healthy population, which, in terms of lower mortality, has been found to produce a 'healthy warrior' effect in comparison with the general population. This effect has been reported to persist after leaving the services but to gradually wane, such that the mortality rate of veterans eventually meets that of the general population (Seltzer & Jablon, 1974).

Many veteran studies have been conducted in the context of media and public interest in PTSD and 'Gulf War syndrome', which may have influenced questionnaire responses. Even true population samples may be vulnerable to framing effects (Di Blasi *et al.* 2001) although we did not find evidence of such an effect in our previous study of 1991 Gulf War veterans (Murphy *et al.* 2006). The potential for such information bias is nevertheless reduced in the current study since respondents were not selected on the basis of their military service and questions on military service were embedded within a range of questions covering different subjects.

We did not find that male veterans experience greater levels of mental health problems than male non-veterans, despite reporting more childhood adversity. While it is known that childhood adversity can adversely impact upon subsequent mental health problems (Zaidi & Foy, 1994; Iversen *et al.* 2007), it is possible that military service might confer protective factors that counteract any negative impacts of combat exposure (Aldwin *et al.* 1994).

### Comparisons with other research

While we report a low prevalence of PTSD, previous studies have reported considerably higher rates (e.g. O'Brien & Hughes, 1991). Our findings are consistent with a representative study of veterans leaving the services between 1997 and 2001, who were not experiencing adversity in terms of mental illness or unemployment (Iversen *et al.* 2005*b*). The majority of this veteran cohort with mental health problems was not seeking treatment due to feeling able to deal with the problem and/or due to perceived stigma (Iversen *et al.* 2005*a*). Iversen *et al.* (2005*b*) also reported that early leavers may experience more symptoms of psychiatric distress and, furthermore, Jones *et al.* (2009) reported that 74% of soldiers hospitalized with mental health problems had left or were discharged, from the Services prematurely. The finding of significant differences between early service leavers and later leavers in terms of alcohol use, suicidal thoughts and self-harm, despite limited power, suggests that early service leavers warrant further investigation.

Unlike the current study, the majority of literature on the health of veterans has found an association between military service and adverse mental health (e.g. Kulka *et al.* 1990). US-based studies, in particular, report higher rates of mental disorders in veterans; however, many of these have not made true population-based comparisons, have been limited to veterans of a particular conflict or have examined still-serving personnel who have recently returned from a campaign. Vietnam-era studies may have found higher rates of psychopathology, possibly due to the negative public reaction to the campaign. A US veteran study nested within a large epidemiological cohort, which included non-veteran controls and also examined a heterogeneous veteran group in terms of experiences, found few differences in psychiatric morbidity in World War II (WWII), Korean, Vietnam and post-Vietnam era veterans compared with non-veterans in each era, although post traumatic stress was not measured. Non-veterans had higher lifetime rates of affective and anxiety disorders (WWII era) and major depressive and schizophrenic disorders (Vietnam era); although post-Vietnam era veterans (1975–1980/1985) were found to have higher lifetime rates of substance use and antisocial disorders (Norquist *et al.* 1990). Another nationally representative study estimated the PTSD prevalence amongst non-wounded US Vietnam War veterans to be 3.5%, rising to 20% in those who reported being wounded (Helzer *et al.* 1987). Recently, rates of treatment seeking among serving US veterans of Iraq and Afghanistan were found to be similar to those in the general US population (Schell & Marshall, 2008).

### Limitations

The number of veterans included is small; thus, this study has limited statistical power. Furthermore, the number of personnel who have served in Iraq and Afghanistan is small.

No information about pre-service mental health status, service type, service arm, deployment history, combat exposure or military role was available. In prior studies of veterans, these factors have been identified as being associated with PTSD and other disorders (Fontana & Rosenheck, 1994; Ikin *et al.* 2007). Furthermore, individuals in communal establishments, including nursing homes and psychiatric hospitals, as well as those who are currently homeless, were not included in the original sample. The veteran sample represents the 'survivors' and excludes those who may be institutionalized for service-related mental and/or physical problems and may lead to an underestimation of disorder rates.

The TSQ does not include PTSD diagnostic criteria relating to avoidance and numbing; however, it has been validated against the Post-traumatic Stress Symptom Scale – Self-report (Foa *et al.* 1993) and the Clinician-Administered PTSD scale diagnostic interview (Brewin *et al.* 2002) with good sensitivity (86%) and specificity (93%) (Brewin *et al.* 2002). It has been reported that the prevalence of PTSD is overestimated when based on self-reported questions compared with clinical interviews and thus even the low prevalence of PTSD reported here is likely to be overestimated (Engelhard *et al.* 2007). The various subcategories of neurotic disorder could not be delineated due to small numbers. Further, while self-reported measures of alcohol use may underestimate actual use, this is likely to impact reporting in both groups. The AUDIT has been found to have good sensitivity and specificity (Piccinelli *et al.* 1997). All measures of violence behaviours have limitations in relation to differential and non-differential measurement error; however, self-reported measures have been shown to capture a greater prevalence of violence than other measures (Lidz *et al.* 1993).

### Conclusions

These results do not suggest that the post-national service veteran population in England fares any worse than a comparable population of non-veterans in terms of psychological ill health, marital stability, social disadvantage or treatment-seeking behaviour. The findings do provide some evidence that early service leavers may experience more mental health problems than those who served for longer.

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## Declaration of Interest

N. T. Fear, C. Woodhead, M. Hotopf, S. Wessely, R. J. Rona and A. Iversen work for the Academic Centre for Defence Mental Health/King's Centre for Military Health Research at King's College London, which receives funding from the UK Ministry of Defence. S. Wessely is an honorary Civilian Consultant Advisor in Psychiatry to the British Army.

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