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Patterns of drinking in the UK Armed Forces

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ABSTRACT

Aims To examine patterns of drinking in the UK Armed Forces, how they vary according to gender and other demographics, and to make comparisons with the general population. **Design** Large cross-sectional postal questionnaire study (response rate 60%). **Setting** United Kingdom. **Participants** A random representative sample of the regular UK Armed Forces who were in service in March 2003 ($n = 8686$; 7937 men, 749 women). Comparisons were made with the general population of Great Britain. **Measurements** Alcohol consumption was assessed using the Alcohol Use Disorders Identification Test (AUDIT). **Findings** Sixty-seven per cent of men and 49% of women in the UK Armed Forces had an AUDIT score of 8+ (defined as hazardous drinking), compared to 38% of men and 16% of women in the general population. In both sexes, for all ages, the military have a higher prevalence of hazardous drinking. Binge drinking was associated with being younger, being in the Army, being single, being a smoker and being white. Among military men, heavy drinking (AUDIT score 16+) was associated with holding a lower rank, being younger, being single, being in the Naval Service or Army, being deployed to Iraq, not having children, being a smoker, having a combat role and having a parent with a drink or drug problem. **Conclusions** Excessive alcohol consumption is more common in the UK Armed Forces than in the general population. There are certain socio-demographic characteristics associated with heavy drinking within the military; for example, young age, being single and being a smoker, which may allow the targeting of preventive interventions.

Keywords Alcohol, Armed Forces, AUDIT, general population, socio-demographic characteristics.

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INTRODUCTION

Recent media reports have focused attention on problems associated with heavy drinking in the UK Armed Forces [1]; for example, implicating alcohol in cases of bullying [2], violence and suicide [3,4]. These reports describe a culture of drinking which, if portrayed accurately, would be detrimental to the health of both individuals and the wider occupational and operational effectiveness of the military. The UK Armed Forces acknowledge that alcohol misuse contributes to violent behaviour, and all three Services are proactive in their attempts to encourage sensible drinking and tackle alcohol misuse, reflected in the publication of new alcohol guidelines [5–7].

Studies based in the United States suggest that heavy drinking is an important public health problem for the military [8,9] and that military personnel drink more than the general population, even after taking age and gender into account [9]. The military literature suggests that heavy drinkers are more likely to experience illnesses and hospitalizations [10], road traffic accidents [8,11], death from drowning [12] and violence [13,14]. Heavy drinkers are also at greater risk of deliberate self-harm [15] and suicide [16]. The occupational consequences for the military include impaired functioning [17] and loss of productivity [18].

Research into alcohol use within the UK Armed Forces has received limited attention [17,19–21]. Little is known about the epidemiology of alcohol use in this group and

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no comparisons with appropriate non-military populations have been made. The aim of the present study is twofold: to examine the patterns of drinking in the UK Armed Forces and to see how they vary according to gender and other key personal and military demographics; and to examine whether there is a difference between UK Armed Forces personnel and the general population in their patterns of drinking.

METHODS

Study sample

Full details of the study and responders can be found in Hotopf *et al*. [22]. In brief, the study was the first phase of a cohort study of UK Armed Forces personnel in service at the time of the Iraq War (Operation TELIC, the military code-name for the current operation in Iraq) in March 2003. In total, 4722 regular and reserve personnel who were deployed on TELIC 1 (the war-fighting phase) and 5550 regular and reserve personnel who were not deployed on TELIC 1 (referred to as 'Era') completed a questionnaire on their military and deployment experiences, life-style factors (including alcohol consumption, see below) and health outcomes. TELIC 1 was defined, for the purposes of this study, as 18 January–28 April 2003.

Measurement of alcohol use

Alcohol consumption was assessed using the Alcohol Use Disorders Identification Test (AUDIT) [23]. The AUDIT is a 10-item questionnaire which assesses alcohol consumption, alcohol dependence and the consequences of alcohol abuse in the previous 12 months. It has been used extensively in the general population, and to a limited extent in the military [24], as a tool for assessing hazardous and harmful alcohol use [25,26].

The AUDIT describes an individual's pattern of drinking in two ways. First, a total AUDIT score can be used to measure 'level of risk related to alcohol', with hazardous drinking defined as an AUDIT score ≥ 8 and a 'high level of alcohol problems' being defined as an AUDIT score ≥ 16. Secondly, the total AUDIT score can be broken down into its three subcomponents: consumption at a hazardous level (defined as a score of 4+ for women and 5+ for men); alcohol dependence (defined as a score of 4+); and alcohol-related harm (defined as a score of 4+). In addition, binge drinking (drinking six or more units of alcohol on one occasion on at least a weekly basis) can be assessed. For the purposes of these analyses, all the above scores and components have been generated.

We have made comparisons with the general population of Great Britain by using the Office for National Statistics National Psychiatric Morbidity Survey, which was conducted between March and September, 2000 [27]. Data were collected by individuals entering their own responses to the AUDIT on a laptop computer in the context of a face-to-face interview with a researcher. The response rate for this survey was 67% ($n = 8580$). All the percentages reported are based on weighted data to account for the survey design and non-response to ensure representativeness of the household population of Great Britain [27].

Military sample

Reported analyses are based on data from regular Service personnel only. Data on alcohol use among reservists (who often have a different military role and social background to regulars) will be reported in a separate publication. The sample considered here consisted of 8686 personnel (7937 men and 749 women).

Statistical analyses

Odds ratios (OR) and 95% confidence intervals (CI) were calculated using multivariable logistic regression [28]. All analyses were performed using the statistical software package STATA (version 9.0) and statistical significance was defined as $P < 0.05$.

Ethical approval

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

RESULTS

Description of drinking in the UK Armed Forces by Service and gender

Table 1 summarizes the overall AUDIT score and the subcomponents for men and women by Service. There were 141 male (2%) and 21 female (3%) non-drinkers (i.e. those with an AUDIT score of 0). For the overall AUDIT score, men had higher scores than women. Among men, the Naval Service (which includes the Royal Marines) and the Army had significantly higher mean AUDIT scores than the Royal Air Force (RAF). Overall for each of the three AUDIT subcomponents, men were proportionately more likely to score positively than women. However, within-Services differences were apparent, with few or no differences being apparent for the RAF by gender. Among males, the Naval Service and the Army were proportionately more likely to score positively for each subcomponent than the RAF. Cronbach's alpha (an indication of the internal validity of the AUDIT score) was 0.77 for the overall score and 0.65, 0.54, 0.64 for its three subcomponents.

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Table 1 Mean AUDIT score [and 95% confidence intervals (CI)] and AUDIT component scores, *n* (%) by gender and Service.

	Men (n = 7937) *Mean (95% CI)*	*Women (n = 749)* *Mean (95% CI)*
AUDIT score (possible range: 0–40)		
Overall	10.41 (10.28–10.54)	8.27 (7.89–8.64)
Naval service	10.78 (10.48–11.08)	8.20 (7.38–9.02)
Army	10.71 (10.54–10.87)	8.35 (7.84–8.85)
RAF	9.18 (8.94–9.43)	8.13 (7.36–8.90)
	n (%)	*n* (%)
Hazardous consumption (score of: 5+ for men, 4+ for women)		
Overall	6727 (85.8)	609 (82.6)
Naval service	1213 (88.4)	120 (88.9)
Army	4191 (85.9)	331 (79.8)
RAF	1323 (83.4)	158 (84.5)
Alcohol dependence (score of 4+)		
Overall	497 (6.4)	34 (4.6)
Naval service	92 (6.7)	6 (4.4)
Army	358 (7.4)	20 (4.8)
RAF	47 (3.0)	8 (4.3)
Alcohol-related harm (score of 4+)		
Overall	1879 (24.0)	117 (15.9)
Naval service	335 (24.4)	17 (12.6)
Army	1267 (26.0)	70 (16.9)
RAF	277 (17.5)	30 (16.2)

Heavy drinking (high levels of alcohol problems as defined by AUDIT score of 16+), men only

Seventeen per cent of men ($n = 1293$) and 9% of women ($n = 64$) reported heavy drinking. Given the small number of women who are heavy drinkers, the following analyses were restricted to men only. After adjustment, heavy drinking in men was associated with holding a lower rank, being younger, not being in a relationship, being in the Naval Service or Army, being deployed on TELIC 1, not having children at home, being a smoker, being in a combat role and having a parent with a drink or drug problem (Table 2). The strongest associations were seen for marital and smoking status.

Binge drinking in the UK Armed Forces by gender

Forty-eight per cent of men ($n = 3769$) and 31% of women ($n = 229$) reported that they drank six or more units of alcohol on one occasion on a weekly or daily basis. This proportion varied by age, with proportionally more binge drinkers among those under 25 years of age for both sexes. However, men consistently reported binge drinking more frequently than women. Five per cent of men ($n = 388$) and 2% of women ($n = 12$) reported binge drinking on a daily basis.

In men, after adjustment, binge drinking was associated with not being in a relationship, not having children at home, being a smoker, being white and having a parent with a drink or drug problem (Table 3a). An association of borderline significance was seen for younger age (< 25 years versus 25–34 years, $P = 0.081$). Among women, binge drinking was associated with being a lower rank, being deployed on TELIC 1, being single, being a smoker and not having children at home (Table 3b). Having a parent with a drink or drug problem was of borderline significance ($P = 0.079$).

Comparisons between the UK Armed Forces and the general population, by age and gender

Across all age groups, the prevalence of hazardous drinking (defined as an AUDIT score of 8+) is more common in the UK Armed Forces than in the general population. Thirty-eight per cent of men and 16% of women in the general population sample fulfilled these criteria versus 67% of men ($n = 5216$) and 49% of women ($n = 361$) in the military sample. The prevalence of severe drinking problems (score of 16 or more on the AUDIT) was also more common in the UK Armed Forces (Table 4). Six per cent of men and 1% of women in the general population sample fulfilled this criterion versus 17% of men ($n = 1293$) and 9% of women ($n = 64$) in the military sample. Table 4 shows that women in the 16–24-year age group in the UK Armed Forces drink more than men of the same age from the general population.

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Table 2 Factors associated with heavy drinking for men ($n = 7937$), odds ratios (OR) and 95% confidence intervals (CI).

	n (%)	*OR (95% CI)*	*Adjusted* OR (95% CI)*
Age (years)			
<25	439 (31.8)	2.03 (1.76–2.34)	1.41 (1.18–1.69)
25–34	602 (18.7)	1.0	1.0
35–44	219 (6.6)	0.41 (0.35–0.48)	0.54 (0.45–0.65)
45+	33 (5.0)	0.23 (0.16–0.33)	0.40 (0.26–0.61)
Rank			
Officer	86 (6.4)	0.30 (0.24–0.38)	0.54 (0.39–0.75)
Other ranks	1207 (18.6)	1.0	1.0
Service			
Naval service	243 (17.7)	0.97 (0.83–1.14)	1.23 (1.01–1.49)
Army	884 (18.2)	1.0	1.0
RAF	166 (10.5)	0.53 (0.44–0.63)	0.79 (0.64–0.98)
Deployment status			
TELIC 1	662 (18.5)	1.30 (1.15–1.47)	1.22 (1.06–1.41)
ERA	631 (14.9)	1.0	1.0
Role within parent unit			
Combat	414 (23.1)	1.87 (1.63–2.16)	1.32 (1.10–1.59)
Medical/welfare	33 (12.4)	0.88 (0.61–1.29)	1.05 (0.68–1.60)
Logistics/supply	158 (15.6)	1.15 (0.95–1.40)	1.04 (0.83–1.32)
Communications	115 (18.5)	1.41 (1.13–1.76)	1.08 (0.83–1.39)
Other	556 (13.8)	1.0	1.0
Marital status			
Married/cohabiting	791 (12.9)	1.0	1.0
Single	404 (33.4)	3.39 (2.95–3.91)	2.00 (1.66–2.41)
Separated/divorced/widowed	95 (20.3)	1.72 (1.36–2.18)	1.58 (1.18–2.11)
Children living at home			
Yes	341 (10.0)	0.41 (0.35–0.47)	0.68 (0.57–0.81)
No	784 (21.4)	1.0	1.0
Educational qualifications			
None	124 (19.9)	1.03 (0.83–1.27)	1.05 (0.82–1.36)
O-levels or equivalent	638 (19.5)	1.0	1.0
A-levels or equivalent	367 (16.4)	0.81 (0.70–0.93)	1.12 (0.95–1.32)
Degree	111 (8.6)	0.39 (0.31–0.48)	1.03 (0.76–1.39)
Smoking status			
Current smoker	607 (26.1)	1.0	1.0
Ex-smoker	267 (14.5)	0.48 (0.41–0.56)	0.62 (0.51–0.75)
Never smoked	417 (11.4)	0.37 (0.32–0.42)	0.41 (0.35–0.49)
Serving status			
Still serving	1145 (16.3)	1.0	–
Left service	142 (18.4)	1.16 (0.95–1.40)	–
Ethnicity			
White	1087 (16.1)	1.0	–
Non-white	40 (16.3)	1.01 (0.71–1.42)	–
Parent with a drink/drug problem			
No	748 (11.5)	1.0	1.0
Yes	241 (18.8)	1.78 (1.52–2.09)	1.69 (1.40–2.05)

*Adjusted for age, rank, Service, deployment status, role within parent unit, marital status, children living at home, educational qualifications, smoking status and having a parent with a drink or drug problem.

When the AUDIT subcomponents are examined (Table 5), hazardous drinking, alcohol dependence and alcohol-related harm are all more common in the UK Armed Forces when compared to the general population.

DISCUSSION

Principal findings

This study examined the patterns of alcohol consumption among 8686 UK regular Armed Forces personnel.

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Table 3 Factors associated with binge drinking for males (a) and females (b), odds ratios (OR) and 95% confidence intervals (CI).

(a) Males (n = 7937)	*n (%)*	*OR (95% CI)*	*Adjusted* OR (95% CI)*
Age (years)			
<25	891 (64.3)	1.70 (1.49–1.93)	1.16 (0.98–1.38)
25–34	1668 (51.4)	1.0	1.0
35–44	1023 (40.0)	0.63 (0.57–0.70)	0.81 (0.71–0.92)
45+	187 (28.1)	0.37 (0.31–0.44)	0.43 (0.34–0.54)
Rank			
Officer	507 (37.7)	0.60 (0.53–0.68)	0.85 (0.71–1.02)
Other ranks	3262 (50.2)	1.0	1.0
Service			
Naval service	671 (48.9)	0.97 (0.86–1.10)	1.03 (0.89–1.20)
Army	2424 (49.6)	1.0	1.0
RAF	674 (42.5)	0.75 (0.67–0.84)	0.89 (0.77–1.03)
Deployment status			
TELIC 1	1830 (50.9)	1.24 (1.13–1.35)	1.06 (0.95–1.19)
ERA	1939 (45.6)	1.0	1.0
Role within parent unit			
Combat	961 (53.4)	1.37 (1.22–1.53)	1.07 (0.92–1.24)
Medical/welfare	109 (41.0)	0.83 (0.64–1.07)	0.84 (0.61–1.15)
Logistics/supply	487 (47.9)	1.10 (0.96–1.26)	1.01 (0.85–1.20)
Communications	319 (51.1)	1.25 (1.05–1.48)	1.00 (0.82–1.23)
Other	1839 (45.6)	1.0	1.0
Marital status			
Married/cohabiting	2603 (42.4)	1.0	1.0
Single	891 (73.5)	3.78 (3.29–4.34)	2.55 (2.11–3.09)
Separated/divorced/widowed	265 (56.4)	1.76 (1.46–2.13)	1.60 (1.26–2.03)
Children living at home			
Yes	1252 (36.4)	0.43 (0.39–0.47)	0.62 (0.55–0.70)
No	2101 (57.2)	1.0	1.0
Educational qualifications			
None	311 (49.8)	0.91 (0.76–1.08)	0.94 (0.76–1.16)
O-levels or equivalent	1713 (52.2)	1.0	1.0
A-levels or equivalent	1064 (47.4)	0.82 (0.74–0.92)	0.90 (0.79–1.03)
Degree	526 (40.6)	0.63 (0.55–0.71)	0.97 (0.81–1.17)
Smoking status			
Current smoker	1334 (57.3)	1.0	1.0
Ex-smoker	867 (47.1)	0.66 (0.59–0.75)	0.80 (0.69–0.93)
Never smoked	1556 (42.6)	0.55 (0.50–0.61)	0.60 (0.53–0.69)
Serving status			
Still serving	3394 (48.2)	1.0	–
Left service	359 (46.1)	0.92 (0.79–1.07)	–
Ethnicity			
White	3278 (48.6)	1.0	1.0
Non-white	94 (37.9)	0.65 (0.50–0.84)	0.59 (0.42–0.82)
Parent with a drink/drug problem			
No	3215 (47.4)	1.0	1.0
Yes	531 (53.4)	1.27 (1.12–1.46)	1.25 (1.07–1.48)
(b) Females (n = 749)	*n (%)*	*OR (95% CI)*	*Adjusted† OR (95% CI)*
Age (years)			
<25	88 (45.4)	1.95 (1.36–2.79)	1.38 (0.85–2.22)
25–34	113 (29.9)	1.0	1.0
35–44	28 (18.9)	0.55 (0.34–0.87)	0.55 (0.30–1.03)
45+	–	–	–
Rank			
Officer	30 (18.6)	0.43 (0.28–0.67)	0.44 (0.21–0.96)
Other ranks	199 (34.6)	1.0	1.0

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Table 3 *Cont.*

(b) Females (n = 749)	*n (%)*	*OR (95% CI)*	*Adjusted† OR (95% CI)*
Service			
Naval service	37 (27.4)	0.74 (0.48–1.14)	–
Army	140 (33.7)	1.0	–
RAF	52 (27.8)	0.76 (0.52–1.11)	–
Deployment status			
TELIC 1	111 (38.4)	1.74 (1.27–2.39)	1.70 (1.14–2.55)
ERA	118 (26.3)	1.0	1.0
Role within parent unit			
Combat	6 (35.3)	1.31 (0.47–3.63)	–
Medical/welfare	35 (24.7)	0.79 (0.51–1.22)	–
Logistics/supply	53 (36.1)	1.36 (0.90–2.03)	–
Communications	21 (38.9)	1.53 (0.85–2.76)	–
Other	109 (29.4)	1.0	–
Marital status			
Married/cohabiting	136 (26.6)	1.0	1.0
Single	79 (43.2)	2.10 (1.48–2.99)	1.84 (1.17–2.91)
Separated/divorced/widowed	12 (30.0)	1.18 (0.59–2.40)	2.00 (0.81–4.96)
Children living at home			
Yes	17 (11.6)	0.26 (0.15–0.46)	0.33 (0.18–0.59)
No	154 (33.1)	1.0	1.0
Educational qualifications			
None	9 (40.9)	1.19 (0.49–2.87)	1.87 (0.64–5.49)
O-levels or equivalent	114 (36.8)	1.0	1.0
A-levels or equivalent	56 (27.5)	0.65 (0.44–0.96)	0.91 (0.56–1.48)
Degree	38 (24.1)	0.54 (0.35–0.84)	1.56 (0.74–3.29)
Smoking status			
Current smoker	96 (43.8)	1.0	1.0
Ex-smoker	46 (27.9)	0.50 (0.32–0.76)	0.50 (0.28–0.89)
Never smoked	86 (24.6)	0.42 (0.29–0.60)	0.55 (0.34–0.89)
Serving status			
Still serving	209 (32.3)	1.0	1.0
Left service	18 (20.5)	0.54 (0.31–0.93)	0.73 (0.38–1.40)
Ethnicity			
White	201 (30.8)	1.0	–
Non-white	9 (40.9)	1.56 (0.65–3.70)	–
Parent with a drink/drug problem			
No	190 (29.6)	1.0	1.0
Yes	37 (42.1)	1.73 (1.10–2.73)	1.68 (0.94–2.99)

*Adjusted for age, rank, Service, deployment status, role within parent unit, marital status, children living at home, educational qualifications, smoking status, ethnicity and having a parent with a drink or drug problem. †Adjusted for age, rank, deployment status, marital status, children living at home, educational qualifications, smoking status, serving status and having a parent with a drink or drug problem.

There are three principal findings to report. First, 49% of women and 67% of men in the military sample report drinking at levels which are considered by the World Health Organization to be harmful for health [25]. Secondly, age- and gender-specific drinking levels and the prevalence of alcohol-related harm and alcohol dependence within the UK Armed Forces are greater than in the general population. Finally, there are socio-demographic associations with heavy drinking within the UK Armed Forces; for example, young age, being single and being a smoker.

Possible explanations for high alcohol intake in the military population

The data we present here show that UK Armed Forces personnel are more likely to drink hazardously than their contemporaries from the general population. There is evidence to suggest increased alcohol consumption and related harm within other 'high risk' allied professions such as fire-fighters and police [29–31], and there is limited evidence to suggest that the military may drink more than these other allied professions. For example,

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Table 4 Distribution of AUDIT scores by gender and age group for the UK Armed Forces and general population, %.

	Males		*Females*	
	Military %	*General population* %	*Military* %	*General population* %
AUDIT score: 8–15				
16–19 years	50	37	71	27
20–24 years	50	48	53	24
25–29 years	52	40	47	21
30–34 years	55	33	32	16
35–39 years	51	35	32	14
40–44 years	48	32	16	13
45+ years	35	27	12	10
AUDIT score: 16+				
16–19 years	36	8	0	5
20–24 years	32	14	15	5
25–29 years	24	10	11	2
30–34 years	14	7	4	1
35–39 years	9	6	6	2
40–44 years	7	4	3	1
45+ years	5	3	0	1

Table 5 Percentage of UK Armed Forces personnel and general population personnel (by gender) scoring positively for hazardous consumption, alcohol dependence and alcohol related-harm (the three AUDIT subcomponents).

	Males		*Females*	
	Military %	*General population %*	*Military %*	*General population %*
Hazardous consumption (score of: 5+ for men, 4+ for women)	86	58	83	47
Alcohol dependence (score of 4+)	6	3	5	1
Alcohol-related harm (score of 4+)	24	15	16	8

86% of the men in the military sample scored positive on the hazardous drinking component of the AUDIT compared to 53% in a recent survey of police officers [32].

On an individual level, pre-enlistment factors may be important. Pre-enlistment alcohol abuse was common in US enlistees and predicted later problems with alcohol once enlisted [33]. The data presented here show an association between parental alcohol misuse and heavy drinking in men.

Wider occupational culture is also important. First, there is the issue of cost and availability. Consumption of alcohol is responsive to price [34]. In military establishments, alcohol is often bought at cost price and sold on with limited profit. Overseas postings attract tax-free alcohol. Junior ranks usually spend less of their income on accommodation, utilities and food and single personnel pay nothing when serving on operations. Social activities may also be subsidized from mess funds.

Alcohol is part of the medium of sociability and mechanism of breaking down barriers between individuals and groups in the military [35], as it is for many other organizations, groups and communities. It is a social 'glue' which can serve to bond people together within a unit, particularly after a deployment or an intensive period of training. This has been shown in similar occupational groups, and there are many overlaps between police 'canteen culture' and military 'mess culture' [36–38].

The difficulty for the military is the balance between responsible and harmful drinking. In the past, drinking at lunchtime and on Friday afternoons among UK Armed Forces personnel was common. Anecdotally, it has been reported that competitive drinking games do still take place; however, such informal practices are now officially strongly discouraged [6], but profound culture shift takes time.

Our data show that military women aged 16–24 years drink more than men of the same age from the general population. It is possible that the same changes that have resulted in young women drinking more in recent years

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within the general population [39] are accentuated in the male-dominated culture of the military. For example, women have higher disposable incomes, greater financial freedom, social freedom and increased status in society and are typically having children later [40]. In addition, there may be pressure on women to be 'one of the boys'. High rates of heavy drinking have been found in women in the US military [41], and in analogous studies of female policewomen rates of hazardous and binge drinking are high [42] and in some cases higher than the rates in male colleagues [43].

Associations with heavy/binge drinking

In both men and women, heavy drinking is more common in young single personnel. This mirrors the findings in the general population and is due to availability, the nature of social activities in younger age groups and the fact that young single individuals are less likely to have children and other domestic responsibilities that make heavy drinking less frequent or possible. The greatly increased intake of alcohol in young Service personnel may be an age effect, as the literature suggests that young people drink more [44]. On the other hand, there is some evidence to suggest that younger individuals may over-report the amounts they drink to 'impress' others [45]; this, *per se*, would not explain the civilian/military differences we report, unless such over-reporting is more likely in the 'macho' military environment (which is plausible).

Lower rank shows an association with heavy drinking in men and with binge drinking in women mirroring the findings from previous US studies [46,47]. This is in contrast to the findings in the UK general population, where there is no clear socio-economic gradient in relation to alcohol consumption among men [44,48]; if anything, women in social classes I and II have been found consistently to drink more [44]. This may be because of greater pre-enlistment vulnerability in lower ranks (as described earlier), but also because a culture of heavy drinking has grown up in lower ranks due to the isolated location of many barracks, the close-knit community where young men often share accommodation and boredom in the evenings as there are few alternative activities after their evening meal is served, in some locations as early at 5 p.m.

In men, heavy drinking was associated with being in the Naval Service or Army, even once rank and educational attainment was controlled for. This may be due to the different subcultures of drinking that have developed within the individual Services. Drinking subcultures are more likely in situations where there is a high level of teamwork resulting in peer pressure [49], where alcohol is freely available, where there is a permissive attitude to drinking [50] and where the traditions of the organization lead to drinking as a means of relaxing and debriefing [51]. It is generally considered that the working environment and operational and technical demands on Army and Naval Service personnel (especially the Royal Marines) are different from those in the RAF. The Army community is close-knit and peer pressure is unsurprising, given the fact that large groups of young men live and work together often sharing rooms; the same is true of personnel on deployed vessels. The length of operational tours is greater in the Army and Royal Marines compared to the RAF, so links within the units between peers are strong and the opportunities for links outside the military are less. RAF personnel are stationed typically in one area for longer and the infrastructure of bases and facilities tends to be more developed, with personnel being more integrated into the local community.

Finally, there is an association between deployment on Operation TELIC 1 and heavy drinking in men. There is some evidence to suggest from population studies that people drink as a mean of coping with occupational or domestic stress, often when the stressor is viewed as chronic and unavoidable [52], and particularly in an environment where the individual or group expectation is that stress is ameliorated by drinking, or in an environment where coping skills, self-efficacy and social support are lacking [53,54].

Strengths and limitations

This study is the largest ever conducted within the UK Armed Forces, with the sample being representative of all three Services.

The AUDIT has high test–retest reliability [55] and higher sensitivity, specificity and positive predictive value than a series of biochemical markers [56]. It also performs similarly to, or better than, other self-report alcohol screening tests [57].

Our response rate of 60% is comparable to that achieved by other population based studies, especially of populations dominated by young men. We have already presented data suggesting that the response rate was due largely to our difficulty in finding people or participant inertia [58], but the possibility that some of the non-response was associated with alcohol intake cannot be excluded.

The comparisons made with the general population [27] are age- and gender-specific, but additional adjustments have not been possible. Examination of the two data sets revealed that non-white ethnicity (a 'protective' factor) was more common in the general population (non-white: 4% UK Armed Forces versus 6% general population), while being single (a 'risk' factor) was also more common among the general population (single: 16% UK Armed Forces versus 21% general population).

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Another difference is that the Armed Forces are representative of the UK, while the general population data are for Great Britain only.

Previous work has shown that there has been a marked increase in alcohol consumption in both genders within the UK Armed Forces, between the 1991 Gulf War and the 2003 Iraq War [21], regardless of deployment status, in contrast to data from the general population (data taken from the General Household Survey for the period 1998–2004) which showed little change regardless of gender [59].

This study looks only at alcohol consumption at one time-point; we plan to repeat the same measures in the same personnel within the next 12 months, this will help to elucidate any changes in alcohol consumption and allow us to evaluate the impact of hazardous alcohol consumption on health and occupational functioning.

Implications

This study demonstrates that a proportion of military personnel is drinking in a way that is detrimental to their individual personal and family health, the safety of themselves and their colleagues and wider group operational effectiveness.

Perceived permissive drinking norms are the strongest direct predictor of employee problem drinking [60], and employees in working environments which discourage problem drinking are less likely to drink heavily or frequently, both at work and home [61]. How can change be facilitated? Alcohol education and health promotion have not been effective [62,63] and can sometimes be counterproductive [64]. For example, an occupational education programme failed to reduce consumption in the Australian police force [30].

Levels of drinking, and hence alcohol-related problems, have been shown to be reduced by imposing stricter controls on the availability of alcohol from shops, pubs, clubs, etc. [34]. Some recruiting establishments in the UK have already experimented with a ban on alcohol during the working week, the use of curfews or introduction of the 'two can rule' with some success [65], and the 'two can rule' or an alcohol ban commonplace in operational environments. Making alcohol more expensive reduces drinking [66]. It is also important to continue to develop alternative activities and locations for alcohol-free activity for young staff in the evenings. Alcohol-free/internet cafes have proved more popular than expected [65], and longer opening hours for gyms or sports facilities may also help to relieve boredom. Finally, in view of the deployment alcohol effect seen here, particular attention needs to be paid to ensuring that sensible drinking is facilitated at key transitions such as decompression and homecoming after deployment.

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Declarations of interest

Neil Greenberg is a full-time active service medical officer who has been seconded to King's Centre for Military Health Research as a liaison officer, Mark Earnshaw is a serving member of the Queen Alexandra's Royal Army Nursing Corps who has been seconded full-time to the Academic Centre for Defence Mental Health and Christopher Barker is a full-time active service medical officer who has collaborated with the authors on this piece of work. Although paid from Ministry of Defence funds they were not directed in any way by the Ministry of Defence in relation to this publication. Simon Wessely is Honorary Civilian Consultant Adviser in Psychiatry to the British Army. All the other authors declare that they have no conflict of interests.

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