Research Square

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Alcohol consumption in the contemporary UK Armed Forces: prevalence of "at risk" drinking and associated factors

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Abstract

Background.

Alcohol use has historically been higher among UK Armed Forces personnel than in the general population, but much of the evidence was generated during sustained military campaigns in Iraq and Afghanistan. Contemporary patterns of alcohol use following substantial changes in the operational context are less well understood.

Aims.

To assess the prevalence of at-risk drinking and associated demographic and military factors among serving regular UK Armed Forces personnel.

Methods.

A cross-sectional study used AUDIT-C screening to categorise alcohol consumption as low, increasing, higher risk or potentially dependent. Demographic and military factors associated with at-risk drinking were examined using multivariable logistic regression.

Results.

Of 613 personnel screened, 229 (37.4%) consented to the full study. Overall, 338 (55.1%) screened at risk (AUDIT-C ≥ 5), including 110 (17.9%) meeting criteria for higher-risk or potentially dependent drinking. Female personnel had lower adjusted odds of at-risk drinking than males (aOR 0.36, 95% CI 0.14–0.93), while single personnel (aOR 3.63, 95% CI 1.18–11.16) and those with previous combat deployment (aOR 2.43, 95% CI 1.01–5.83) had higher odds. Personnel meeting criteria for higher-risk or potentially dependent drinking were less likely to consent to the full study (26.4% versus 39.8%; p = 0.009).

Conclusions.

At-risk drinking remains common in the contemporary UK Armed Forces, with most alcohol-related risk occurring below thresholds for high risk and potential dependence. Occupational health approaches should address increasing-risk drinking as well as the heaviest consumption. Lower participation among higher-risk drinkers also warrants consideration in future alcohol research.

TEASER TEXT

Alcohol use remains common in the contemporary UK Armed Forces, despite substantial changes in military operations over the past decade. More than half of personnel screened reported drinking above the low-risk threshold, although potentially dependent drinking was uncommon. Women were less likely to report at-risk drinking, while single personnel and those with previous combat deployment had higher odds. Those drinking at higher-risk levels were also less likely to participate in further research.

KEY LEARNING POINTS

What is already known about this subject

• Alcohol use has historically been high among UK Armed Forces personnel, but much of the evidence was generated during sustained military campaigns in Iraq and Afghanistan.

• Reported prevalence has varied according to the populations studied, sampling methods and alcohol measures used.

• Contemporary patterns of alcohol consumption following substantial changes in the operational context of UK military service are less well understood.

What this study adds

• More than half of personnel screened reported at-risk drinking, with most alcohol-related risk occurring below thresholds for potential dependence.

• Female personnel had lower adjusted odds of at-risk drinking, while single personnel and those with previous combat deployment had higher odds.

• Personnel with higher levels of alcohol consumption were less likely to participate in the full study, demonstrating participation bias that may affect alcohol research relying solely on consenting participants.

What impact this may have on practice or policy

• Occupational health approaches should address the large proportion of personnel drinking at increasing-risk levels rather than focusing solely on those with the heaviest alcohol consumption.

• Early identification and intervention may help reduce the wider health and occupational burden associated with alcohol use below thresholds for potential dependence.

• Future alcohol surveillance and research should consider that those at greatest risk may be less likely to participate, potentially limiting the representativeness of consenting study samples.

INTRODUCTION

Alcohol consumption is a leading modifiable risk factor for preventable morbidity and mortality worldwide and contributes substantially to the global burden of disease[1–3]. Within occupational settings, hazardous alcohol use can adversely affect health, workplace safety, and [4–7][3,5]. These issues are particularly relevant in military populations, where personnel are required to maintain high levels of physical and psychological fitness, deployability and operational readiness throughout their careers[5,8]. Characterising patterns of alcohol use in serving military personnel is therefore important to inform occupational health policy and the development of targeted prevention strategies.

Historically, studies of UK Armed Forces (UKAF) personnel have consistently reported a high prevalence of hazardous alcohol use, making it a longstanding focus of military public health research[5,6,8,9]. A range of occupational, demographic and cultural factors have been proposed to contribute to this pattern, including the relatively young age profile of military personnel, a male-dominated workforce, communal living and working environments, and the role of alcohol in fostering social cohesion, celebration and decompression after training and operations[8,10–12]. A landmark cohort study, initiated in the early 2000s, identified high levels of hazardous alcohol use and demonstrated associations with younger age, male sex, combat exposure and smoking[8,13]. Other studies have broadly supported these findings, although estimates of alcohol use have varied according to the populations studied and sampling methods employed. Most have focused on the impact of military operations in Iraq and Afghanistan when the demographic composition, operational commitments and occupational demands differed to those of today.

It is now almost a decade since the end of these campaigns, and the UKAF have transitioned to being prepared for contingency operations, persistent global engagement and renewed strategic threat. Contemporary estimates of alcohol use are therefore needed to determine whether the epidemiology of hazardous drinking has changed and to identify those personnel who remain at greatest risk of alcohol related harm. This study aimed to estimate the prevalence of alcohol use in a contemporary sample of serving Regular UKAF personnel and examines demographic and military factors associated with at-risk drinking.

METHODS

Study design and participants

The Drinking and Wellbeing study (D&W) was a cross-sectional survey of serving UKAF personnel conducted between October 2023 and July 2024[14]. Participants were recruited primarily through routine dental inspections undertaken within Defence Primary Health Care (DPHC), during which eligible personnel were invited to complete an anonymous online screening questionnaire. Additional participants were recruited through Defence communications including the Defence intranet, social media, and established Defence messaging channels. Eligible participants were currently serving Regular members of the UKAF, aged 16 years or over. Personnel who had left military service, who serve in a civilian role with Defence, or who were unable to provide informed consent were excluded. A

minimum sample size of 383 screened participants was calculated to estimate alcohol prevalence in the UKAF with a 95% confidence level and 5% margin of error.

Data collection

Alcohol consumption was assessed using the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)[15], with additional items administered to assess wider drinking behaviours. Potential participants completed an anonymous AUDIT-C screening questionnaire before being invited to join the D&W study. Those providing consent subsequently completed an online questionnaire comprising demographic, military and health related measures. Demographic information included age, sex, relationship status, and educational attainment. Military characteristics included Service, rank, years of service, deployment history and role.

Measures

The AUDIT-C is a validated three-item screening tool measuring alcohol consumption. AUDIT-C has been validated across a range of healthcare settings, including military populations, where higher cut-off scores have sometimes been proposed because of the higher baseline prevalence of alcohol consumption [15–17]. To facilitate comparison with civilian datasets and the published military literature, alcohol use was categorised using the standard AUDIT-C risk categories: low risk (score 0-4), increasing risk (5-7), higher risk (8-10) and potentially dependent (11-12). For analyses of demographic and military characteristics, ‘at-risk’ drinking was defined as AUDIT-C score >4. Higher risk and potentially dependent categories were additionally combined to create a higher risk and potentially dependent (HRPD) category where AUDIT-C was ≥8.

Statistical analysis

Analyses were undertaken using Stata version 18 (StataCorp, College Station, TX, USA)[18]. Alcohol consumption was categorised according to established AUDIT-C thresholds. Alcohol prevalence estimates were derived from the complete screened sample. Analyses of demographic and military characteristics associated with alcohol use were undertaken in participants of the D&W study.

Participant characteristics were summarised using frequencies and percentages for categorical variables and means with standard deviations or medians with interquartile ranges for continuous variables, according to data distribution. Associations between demographic and military characteristics and ‘at-risk’ drinking were examined using multivariable logistic regression. Variables entered into the model included sex, age group, Service, rank group, relationship status, parenthood, educational attainment and previous combat deployment. Military trade was summarised descriptively but not entered into the adjusted model because of small cell sizes. Adjusted odds ratios (aORs) with 95% confidence intervals are reported. Statistical significance was defined as $p<0.05$.

Ethics

Ethical approval was granted by the Ministry of Defence Research Ethics Committee (MODREC 2154/MODREC/22). All participants provided informed consent electronically before completing the questionnaire.

RESULTS

Screening, alcohol prevalence and consent

Between October 2023 and July 2024, 613 serving UKAF personnel completed the AUDIT-C screening questionnaire. Alcohol consumption prevalence estimates were derived from this screened population. Table 1 shows the distribution of AUDIT-C risk category for the screened population. Overall, 275 personnel (44.9%) were classified as low-risk drinkers, while 338 (55.1%) reported alcohol consumption above the low-risk threshold. The majority of these were classified as increasing risk drinkers (228, 37.2%, with 103 (16.8%) classified as higher risk, and only 7 (1.1%) meeting the AUDIT-C screening threshold for potentially dependent drinking.

Table 1: Distribution of AUDIT-C Risk Category for Screened Participants (n=613)*.

	Low Risk (AUDIT-C ≤4)	**Increasing Risk** (AUDIT-C 5-7)	**Higher Risk** (AUDIT-C 8-10)	**Potentially Dependent** (AUDIT-C 11-12)
D&W Screening (n=613)	275 (44.9%)	228 (37.2%)	103 (16.8%)	7 (1.1%)

**'At-risk' drinking was defined as AUDIT-C >4 (338, 55.1%). HRPD drinking was defined as AUDIT-C ≥8 (110, 17.9%)*

Of the 613 people screened, 229 consented to participate in the D&W study and formed the analytic cohort for demographic and military associations. Personnel classified as 'at-risk' drinkers (AUDIT-C >4) were significantly less likely to consent than those in the low-risk category (χ^2=4.96, p=0.03). Similarly, participants meeting the criteria for HRPD drinking (AUDIT-C ≥8) were also significantly less likely to consent than those below this threshold (26.4% vs 39.8%; χ^2 =6.92, p=0.009). As demographic and military characteristics were collected only from participants who consented to the D&W study, all subsequent analyses relate to this cohort (n=229).

Participant characteristics

The characteristics of the D&W participants are summarised in Table 2. Participants were predominantly male (83%) and Army (56%), with 38% serving in the Royal Navy/Royal Marines and 6% in the Royal Air Force. The mean age was 35 years (SD 9.6; range 18-60) and participants had served in the UKAF for a mean of 14.3 years. Most participants were Other Ranks (66%), 60% had degree-level qualifications, 46% were married or in a civil partnership, and 35% had deployed on Operation HERRICK or TELIC (the names for military operations in Afghanistan and Iraq respectively).

Table 2: Characteristics of the consenting Drinking and Wellbeing study cohort (n = 229) and mean AUDIT-C score by participant characteristics

	Characteristic	Number (%)	Mean AUDIT-C Score (SD)
Overall		229	4.56 (2.52)
Length of Service (years); Mean (SD)		14.3 (9.40)	
Age (in years)*; Mean (SD)		35 (9.6)	
	<20	19 (8%)	4.37 (1.71)
	20-24	27 (12%)	4.74 (2.36)
	25-29	30 (13%)	4.03 (1.96)
	30-34	33 (14%)	4.42 (2.87)
	35-39	55 (24%)	4.67 (2.85)
	40-44	28 (12%)	5.25 (2.20)
	45-49	20 (9%)	4.65 (2.92)
	50+	16 (7%)	4.56 (2.52)
Sex	Male	189 (83%)	4.61 (2.62)
	Female	40 (17%)	4.33 (1.95)
Relationship Status*	Married/Civil Partnership	105 (46%)	4.29 (2.58)
	Long Term Relationship	61 (27%)	4.74 (2.64)
	Single	49 (21%)	5.00 (2.13)
	Separated / Divorced	13 (6%)	4.23 (2.74)
Children	Children	106 (46%)	4.19 (2.53)
	No Children	122 (54%)	4.87 (2.49)
Qualifications*	Degree	137 (60%)	4.57 (2.36)
	Other Qualifications	80 (35%)	4.46 (2.75)
	No Qualifications	11 (5%)	5.09 (2.84)
Service**	Royal Navy/Royal Marines	87 (38%)	4.67 (2.45)
	British Army	127 (56%)	4.48 (2.61)
	Royal Air Force	14 (6%)	4.57 (2.06)
Rank**	OF 0-4	76 (33%)	4.41 (2.25)

	OF 5-9	2 (1%)	3.00 (4.24)
	OR 2-4	97 (43%)	4.27 (2.43)
	OR 6-9	52 (23%)	5.35 (2.90)
Military Trade*	Combat / Infantry	90 (39%)	4.33 (2.58)
	Comms / Intelligence	10 (4%)	5.10 (2.73)
	Engineering	41 (18%)	5.07 (2.64)
	Logistics / Supply / Catering	11 (5%)	4.91 (2.62)
	Medical / Welfare	27 (12%)	4.52 (1.91)
	Aviation	17 (7%)	4.12 (1.76)
	Police / Force Protection	4 (2%)	5.25 (3.30)
	EOD / Diving	6 (3%)	6.50 (2.35)
	Other	22 (10%)	3.81 (2.82)
Previous Combat Deployment	Yes	79 (35%)	4.96 (2.83)
	No	149 (65%)	4.32 (2.31)

*One observation missing. **Two observations missing. Not provided by participants.

Demographic and military characteristics associated with 'at-risk' drinking

Of the 229 consenting participants, 113 (49.3%) met the criteria for 'at-risk' drinking (AUDIT-C >4). After adjustment for demographic and military characteristics, female personnel had lower odds of 'at-risk' drinking than male personnel (aOR 0.36, 95%CI 0.14-0.93). Compared with married personnel, those who were single had over three times the odds of 'at-risk' drinking (aOR 3.63, 95%CI 1.18-11.16). Previous deployment on Operation HERRICK or TELIC was also associated with increased odds of 'at-risk' drinking after adjustments (aOR 2.43, 95%CI 1.01-5.83). No significant associations were observed with age, Service, rank, educational attainment or parenthood (Table 3).

Similar analyses were undertaken for HRPD drinking. Owing to the small number of participants meeting this threshold (n=29), estimates were imprecise and no demographic or military characteristics remained independently associated with HRPD after adjustment (Supplementary Table 1).

Table 3: Multivariable logistic regression of factors associated with 'at-risk' drinking (AUDIT-C>4).

	Total sample n (%)	Adjusted OR (95% CI)*
Sex	n=229	
Male	189 (82.5%)	1 (reference)
Female	40 (17.5%)	0.36 (0.14 – 0.93)
Age Group	n=228	
<20	19 (8.3%)	0.25 (0.05 to 1.27)
20-24	27 (11.8%)	0.36 (0.83 to 1.59)
25-29	30 (13.2%)	0.27 (0.07 to 1.02)
30-34	33 (14.5%)	0.60 (0.20 to 1.85)
35-39	55 (24.1%)	1 (reference)
40-44	28 (12.3%)	2.48 (0.78 to 7.80)
45-49	20 (8.9%)	0.85 (0.25 to 2.82)
50+	16 (7.0%)	0.47 (0.13 to 1.75)
Family Status	n=228	
Married / Civil Partnership	105 (46.1%)	1 (reference)
Long term & Living With	61 (26.8%)	2.57 (1.00 to 6.56)
Single	49 (21.5%)	3.63 (1.18 to 11.16)
Separated / Divorced	13 (5.7%)	1.20 (0.32 to 4.51)
Children	n=227	
Yes	106 (46.7%)	0.58 (0.26 to 1.27)
No	121 (53.3%)	1 (reference)
Qualifications	n=228	
Degree	137 (60.1%)	1 (reference)
Other qualification	80 (35.1%)	1.56 (0.71 to 3.45)
No qualifications	11 (4.8%)	1.52 (0.31 to 7.42)
Service	n=228	
RN/RM	87 (38.2%)	1.08 (0.49 to 2.39)

	0	
Army	127 (55.7%)	1 (reference)
RAF	14 (6.1%)	3.32 (0.77 to 14.4)
Rank Category	n=227	
Junior OR	97 (42.7%)	1 (reference)
Senior OR	52 (22.9%	0.88 (0.29 to 2.68)
Junior Officer	76 (33.5%)	0.93 (0.34 to 2.53)
Senior Officer	2 (0.9%)	1.06 (0.05 to 24.61)
Trade	n=228	
Analysis not conducted due to small sample sizes for individual trade groups.		
Previous Combat Deployment	n=228	
Yes	149 (65.4%)	2.43 (1.01 to 5.83)
No	79 (34.6%)	(reference)

** Adjusted for sex, age group, Service, NATO status, relationship status, children, educational attainment, rank category and previous combat deployment.*

DISCUSSION

Principal findings

This study provides a contemporary assessment of alcohol consumption in a sample of serving Regular UKAF personnel following a period of change in the operational context. Over half of personnel screened reported alcohol consumption above the low-risk threshold, with almost one in five meeting criteria for HRPD drinking. Importantly, personnel reporting higher levels of alcohol consumption, particularly those meeting criteria for HRPD drinking, were significantly less likely to participate in the full survey. Consequently, analyses of demographic and military characteristics may underestimate the strength of associations between participant characteristics and alcohol misuse within the wider serving population.

Female personnel were significantly less likely to report ‘at-risk’ drinking, while single relationship status and previous operational deployment were independently associated with increased odds of ‘at-risk’ alcohol use. Previous studies of alcohol use in the UKAF were undertaken largely during, or shortly after, sustained military campaigns in Iraq and Afghanistan[8,10,11,19–21]. Those studies therefore reflected a military population experiencing repeated deployments, and high operational tempo, for a sustained

overseas conflicts. The present study extends this evidence by describing alcohol consumption in a contemporary serving population following a change in the operational demands towards smaller, short notice operations within a more dynamic and broader range of global security challenges. Although reported prevalence has varied across studies, likely due to differences in sampling strategies and alcohol measures, our findings suggest that alcohol consumption above the low-risk threshold remains a common feature of military service despite the changes in operational context.

The observed association between previous combat deployment and 'at-risk' drinking is consistent with previous studies of UK military personnel but should not be interpreted as evidence of a causal relationship. Personnel with previous combat deployments are demographically different to those without the exposure. Deployment may also be associated with experience of traumatic events and, consequently, with conditions such as post-traumatic stress disorder, which has well established associations with alcohol misuse[22–27]. Those who join combat trades are potentially also more likely to have pre-service risk factors for risky drinking [28,29]. It is therefore likely that deployment acts as a marker for a complex combination of demographic, occupational and psychological factors rather than being an independent driver of alcohol consumption. Although deployment remained independently associated with 'at-risk' drinking in the adjusted model, residual confounding cannot be excluded with the cross-sectional design of this study.

The persistence of elevated alcohol use despite changes in the operational context of the UKAF suggests that explanations beyond combat exposure alone should be considered. Similar patterns of risky alcohol use have been described in other occupations characterised by exposure to physical risk, traumatic events and strong occupational cultures, including firefighters and other emergency service personnel[30,31]. One potential explanation is that alcohol use may reflect, at least in part, broader behavioural characteristics associated with individuals attracted to these occupations. Military service, like other higher-risk professions, requires individuals willing to accept greater levels of physical and psychological risk, and it is plausible that alcohol consumption may form part of a wider behavioural profile that includes sensation-seeking or risk-taking tendencies[32]. Sensation-seeking has long been recognised as a normal personality trait characterised by a preference for novel, stimulating and challenging experiences, and has been linked to both occupational choice and alcohol use through its disinhibition component[33,34]. The military working environment is highly stimulating and variable, and may therefore attract individuals with these characteristics[32,35]. This hypothesis remains speculative and cannot be tested within the present study but offers a potential framework for understanding why higher alcohol consumption is seen in higher-risk occupations.

Female personnel had substantially lower adjusted odds of 'at-risk' drinking than their male counterparts, a finding consistent with previous studies of alcohol use within military and the wider civilian literature[8,36,37]. Sex differences in alcohol consumption of have been attributed to a complex interplay of biological, psychological and socio-cultural factors, including differing drinking norms, motivations for alcohol use and patterns of social drinking[38,39]. These findings suggest that sex remains an important consideration when designing alcohol prevention and occupational health initiatives. However, almost

one-third of females met criteria for ‘at-risk’ drinking, indicating that alcohol misuse should not be regarded solely as a male occupational health issue[37,40].

Although alcohol consumption above the low-risk threshold was common, relatively few personnel met criteria for potentially dependent drinking. This distinction has important occupational implications. The burden associated with alcohol use in the UKAF appears to arise predominantly from a large proportion of personnel drinking at increasing risk levels, rather than from alcohol dependence. Consequently, while the occupational impacts of alcohol are reported as being dose-dependent[5], public health strategies should extend beyond identifying individuals with severe alcohol problems to include earlier recognition and intervention among increasing risk drinkers. While the individual occupational consequences of increasing risk drinking may be less marked than those associated with HRPD drinking, its much greater prevalence means that it is likely to contribute more to the overall health and organisational burden. This distinction is particularly relevant in military and other high-risk occupations where safety critical decision making, operational readiness and long-term health may all be affected by patterns of alcohol consumption that fall short of dependence.

Strengths and limitations

The principal strengths of this study include the large screened cohort, inclusion of personnel from all three services, and use of a validated alcohol screening instrument, with standardised risk categories, facilitating comparison with the wider literature. Unlike many studies of alcohol use, the comparison of the consenting cohort with the whole screened sample enabled assessment of participation bias, demonstrating that personnel reporting higher levels of alcohol consumption were significantly less likely to participate in the full study. This finding highlights an important methodological consideration for future alcohol research and suggests that studies relying solely on consenting participants may underestimate the strength of association between participant characteristics and alcohol misuse. The study also has limitations. Its cross-sectional design precludes inference of causal relationships, alcohol consumption was self-reported and therefore subject to reporting bias, and the relatively small number of participants meeting criteria for HRPD drinking limited statistical power for this subgroup.

Conclusion

Alcohol consumption above the low-risk threshold remains common among serving UKAF personnel. Most personnel above the low-risk threshold were in the increasing-risk category rather than the HRPD category. This emphasises the importance of preventative occupational health approaches that focus on this group rather than solely the heaviest consumers. Future research should seek to better understand the occupational, behavioural and cultural factors underpinning alcohol use in military personnel and other high-risk professions to inform more effective occupational and public health strategies.

Declarations

Ethics approval

Ethical approval was granted by the Ministry of Defence Research Ethics Committee (MODREC 2154/MODREC/22). All participants gave electronic informed consent to participate.

Availability of data and materials

The data that support the findings of this study are available from the corresponding author but restrictions apply to the availability of these data, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the Ministry of Defence Data Protection Officer (cio-dpa@mod.uk).

Competing interests

KK conducted this work as part of a Doctorate in Medicine degree with King's College London. KK is employed by the Royal Navy. DL is a reservist in the British Army and this work has been undertaken as part of his civilian employment. NTF's salary at King's College London was supported by a grant from the UK Ministry of Defence. She was an unpaid trustee for the Help for Heroes charity. NG is President of the Society of Occupational Medicine.

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