



Loneliness among UK Veterans: Associations with quality of life, alcohol misuse, and perceptions of partner drinking

Charlotte Williamson^a, Alice Wickersham^b, Marie-Louise Sharp^a, Danielle Dryden^c, Amos Simms^d, Nicola T. Fear^a, Dominic Murphy^e, Laura Goodwin^f and Daniel Leightley^a

ABSTRACT

Introduction: Loneliness occurs when there is a disparity between the quantity and quality of social relationships people have and the ones they want. Research shows loneliness is negatively associated with quality of life and alcohol misuse, two common issues for military Veterans. Loneliness can also be affected by partner drinking, particularly if it does not match Veterans' drinking behaviour. This study aimed to explore 1) the association between loneliness, quality of life, and alcohol misuse, and 2) the association between perceived partner drinking and loneliness in a sample of treatment-seeking UK Veterans. **Methods:** A total of 163 treatment-seeking UK Veterans completed a self-report questionnaire via the DrinksRation smartphone application. Loneliness was measured using the 3-item UCLA Loneliness Scale. Linear regressions explored associations between loneliness, quality of life, and alcohol misuse. Logistic regressions explored associations between perceived partner drinking and loneliness. **Results:** Almost two-thirds of participants reported feeling lonely (65.6%). Unadjusted linear regressions showed lonely Veterans had lower quality-of-life scores across all domains and higher alcohol misuse scores than non-lonely Veterans. After full adjustment, loneliness was significantly associated only with the physical health, social relationships, and quality-of-life domains. Logistic regressions revealed no significant associations between perceptions of partner drinking and loneliness. **Discussion:** This study found lonely treatment-seeking Veterans had poorer quality of life and higher alcohol misuse than non-lonely counterparts. Innovative ways to reduce loneliness and improve social connectedness for Veterans are required, particularly for those with mental health needs and who drink heavily.

Key words: alcohol misuse, armed forces, loneliness, military, partner drinking, quality of life, treatment seeking, UK, Veterans

RÉSUMÉ

Introduction : Un sentiment de solitude est éprouvé lorsqu'il y a un écart entre la quantité et la qualité des relations sociales vécues et celle souhaitées. Les recherches démontrent que la solitude est associée de façon négative à la qualité de vie et au mésusage d'alcool, deux problèmes courants chez les vétéran(e)s des Forces armées canadiennes (FAC). La solitude peut également être influencée par la consommation d'alcool du(de la) partenaire, surtout lorsqu'elle ne correspond pas à celle du(de la) vétéran(e). Cette étude visait à explorer 1) l'association entre la solitude, la qualité de vie et le mésusage d'alcool et 2) l'association entre la consommation d'alcool perçue du(de la) partenaire et la solitude au sein d'un échantillon de vétéran(e)s britanniques qui cherchaient à obtenir un traitement. **Méthodologie :** Au total, 163 vétéran(e)s britanniques qui cherchaient à obtenir un traitement ont rempli un questionnaire auto-évalué via l'application smartphone DrinksRation. La solitude a été mesurée au moyen de l'Échelle de solitude en trois questions de l'UCLA. Les régressions linéaires ont exploré les associations entre la solitude, la qualité de vie et le mésusage d'alcool. Des régressions logistiques ont exploré les associations entre les perceptions de la consommation d'alcool du(de la) partenaire et la solitude. **Résultats :** Près des deux tiers des participant(e)s ont déclaré ressentir de la solitude (65,6 %). Les régressions linéaires non corrigées ont révélé que les vétéran(e)s qui éprouvaient de la solitude présentaient de moins bons scores de qualité de vie dans tous les domaines et des scores de mésusage d'alcool plus élevés que les vétéran(e)s qui ne ressentaient pas de solitude. Après correction complète, la solitude était associée de manière significative seulement

^a King's Centre for Military Health Research, King's College London, London, United Kingdom

^b Department of Child and Adolescent Psychiatry, King's College London, London, United Kingdom

^c Department of Psychological Medicine, King's College London, London, United Kingdom

^d British Army, London, United Kingdom

^e Combat Stress, Tyrwhitt House, Leatherhead, United Kingdom

^f Division of Health Research, Lancaster University, Lancaster, United Kingdom

Correspondence should be addressed to Charlotte Williamson at King's Centre for Military Health Research, King's College London, Weston Education Centre, London, United Kingdom, SE5 9RJ. Telephone: 44-207-848-5351. Email: charlotte.1.williamson@kcl.ac.uk

aux domaines de la santé mentale, des relations sociales et de la qualité de vie. La régression logistique n'a révélé aucune association significative entre les perceptions de la consommation d'alcool du(de la) partenaire et la solitude. **Discussion :** Cette étude a démontré que les vétérans(e)s qui cherchaient à obtenir un traitement et qui ressentaient de la solitude avaient une moins bonne qualité de vie et mésusaient davantage de l'alcool que leurs homologues qui n'éprouvaient pas de solitude. Il faudra trouver des moyens novateurs pour réduire la solitude et améliorer la connectivité sociale des vétérans(e)s, particulièrement chez ceux(elles) qui ont des troubles de santé mentale et qui boivent beaucoup.

Mots-clés : consommation d'alcool du(de la) partenaire, forces armées, mésusage d'alcool, militaire, qualité de vie, recherche de traitement, R.-U., solitude, vétéran(e)s

LAY SUMMARY

Loneliness occurs when there is a difference between the number and the quality of the social relationships people have and the ones they want. Research shows loneliness is negatively associated with quality of life and alcohol misuse; two common issues for military Veterans. Loneliness can also be affected by partner drinking, particularly if it does not match Veterans' drinking behaviour. This study explored 1) the relationship between loneliness, quality of life, and alcohol misuse, and 2) the relationship between loneliness and perceived partner drinking among a sample of treatment-seeking UK military Veterans. In total, 163 treatment-seeking UK Veterans completed a survey via a smartphone application, DrinksRation, which included questions about their health and well-being. A large percentage of the sample reported loneliness (66%). This study found lonely treatment-seeking Veterans had poorer quality of life and higher alcohol misuse than non-lonely Veterans.

INTRODUCTION

Loneliness has been defined as “a subjective, unwelcome feeling of lack or loss of companionship, which happens when there is a mismatch between the quantity and quality of the social relationships that we have and those that we want.”¹ Loneliness is a major public health concern and is associated with a higher risk of mental and physical health illnesses,^{2,3} including high blood pressure,⁴ poor sleep,⁵ depression,⁶ suicidal ideation,⁷ and risky behaviours such as alcohol misuse.⁸ Although loneliness is a recognized problem for the general population, Veterans present with unique experiences of loneliness.

Military members have specific needs and experiences that may place them at greater risk of loneliness, particularly after leaving the supportive structure of the armed forces.⁹ For instance, they go through an increased number of transitions and may lose touch with peers, which may mean they experience loneliness in a unique way.¹⁰ In a survey conducted by the Royal British Legion, 25% of Veterans indicated they felt lonely or socially isolated always or often.¹¹ Additionally, in the National Health and Resilience in Veterans study in the United States, 44% of older Veterans (≥60 years old) reported feeling lonely at least some of the time.¹² Loneliness is one of the strongest predictors of social well-being in the Veteran community.¹³ Although most Veterans transition well from military to civilian life, some may experience loneliness. It could be that after leaving service, Veterans no longer feel part of the mili-

tary family, lose the camaraderie they were used to, and experience a shift in sense of self. This is supported by existing qualitative research exploring UK Veterans' experience of loneliness in which Veterans reported a sense of loss and difficulty connecting in civilian life.¹⁴

Loneliness was identified as a prevalent issue in Veterans seeking help for mental health problems (i.e., treatment-seeking Veterans) (79%) and was reported to be strongly associated with more severe mental health presentations among this population.¹⁵ Alcohol misuse is also associated with loneliness and, although there is little clear evidence as to the direction of this relationship,¹⁶ research suggests consuming alcohol at high levels is associated with loneliness.¹⁷ Treatment-seeking Veterans report high levels of hazardous alcohol misuse and have different patterns of alcohol misuse than the general armed forces population.¹⁸ When taken together, Veterans with multiple risk factors, such as mental health difficulties and alcohol misuse, may be more likely to experience negative outcomes such as loneliness.

Relationships with partners can play an important role in experiences of loneliness as they can act as either a source of support or strain. One UK study found Veterans who reported COVID-19 stressors of difficulties with family or other social relationships were more likely to report loneliness.¹⁹ Partner drinking can also impact levels of loneliness, particularly if it does not match with Veterans' own drinking behaviour. Although partners may benefit from an increase in social interaction and time spent together when drinking,

there may also be negative consequences. For instance, if both members of a couple drink hazardously, this could lead to poorer health and well-being. Despite the prevalence of alcohol misuse among military Veterans in the UK, there is limited evidence to suggest that hazardous alcohol consumption is a common outcome among military partners/spouses. Of the evidence that does exist, the majority is research based in the United States.²⁰

Research shows that loneliness is associated with several negative outcomes and that loneliness is a prevalent issue for military Veterans, especially treatment-seeking Veterans. By better understanding loneliness among treatment-seeking Veterans, specialized support can be implemented when they leave the armed forces, and treatment services for Veterans can be better aligned with their needs. The aims of this exploratory study were 1) to investigate the association between loneliness, quality of life, and alcohol misuse, and 2) to explore the association between perceived partner drinking and loneliness among UK treatment-seeking Veterans.

METHODS

Setting

This is a secondary analysis using cross-sectional baseline data from the DrinksRation study, a randomized controlled trial (RCT) assessing the efficacy of a novel smartphone application (app) at reducing alcohol consumption among UK military Veterans.²¹⁻²⁴ Before conducting the RCT, a pilot study was conducted to test usability of the app.²⁵ The DrinksRation RCT findings are available elsewhere.²⁶ This study was approved by the local ethics committee of King's College London (registration number: HR-19/20-17438).

Participant sample

Participants were recruited between October 2020 and April 2021. Recruitment took place via 1) partner organizations, such as Combat Stress (a UK Veterans' mental health charity) and the King's Centre for Military Health Research Health and Wellbeing study cohort,²⁷ and 2) social media and Facebook advertising (see Williamson et al. for further information regarding participant recruitment).²⁸ Participant eligibility criteria included 1) being a Veteran of the UK Armed Forces, 2) owning a smartphone, and 3) having sought help for a mental health disorder in a clinical setting (treatment seeking). A Veteran in the UK is defined as an individual who served a minimum of one day in the

UK Armed Forces but no longer serves.²⁹ In total, 163 participants met eligibility criteria.

Procedure

Participants were asked to download the DrinksRation app onto their smartphones and to complete baseline and follow-up questionnaires when prompted. Questionnaire prompts were sent via personalized notifications.³⁰ The DrinksRation app was designed to support the management and reduction of alcohol consumption. Participants could choose to use the app as often or as little as they found useful. For this study, data were restricted to measures completed at baseline.

Materials and measures

Baseline data were collected directly through the DrinksRation app and completed when a participant signed up to the app. Baseline measures included socio-demographic characteristics (e.g., age, gender, ethnicity, and marital status), military characteristics (e.g., serving status and length of service), and mental health and well-being outcomes (e.g., loneliness, quality of life, and alcohol use). Participants who self-reported being married or in a relationship were categorized as having a partner.

Loneliness was measured using the 3-item UCLA Loneliness Scale.³¹ Each question was scored from 1 to 3, meaning the maximum total score was 9, and a score of 6 or more indicated loneliness as recommended by Hughes et al.³¹ Quality of life was measured using The World Health Organization Quality of Life-BREF (WHOQOL-BREF).³² This 26-item, self-report questionnaire evaluates the context of an individual's culture, value systems, personal goals, standards, and concerns. It comprises four domains: 1) physical health, 2) psychological health, 3) social relationships, and 4) environment. A higher score indicates better quality of life in that domain.

Alcohol consumption data was collected via the 10-item Alcohol Use Disorder Identification Test (AUDIT-10).³³ Items 1-8 included questions such as "how often do you have a drink containing alcohol?" and "how often during the last year have you had a feeling of guilt or remorse after drinking?" and were scored from 0 to 4 (never [0], less than monthly [1], monthly [2], weekly [3], and daily or almost daily [4]). Questions 9-10 asked "have you or someone else been injured as a result of your drinking?" and "has a relative or friend or doctor or other health worker been concerned about your drinking or suggested you cut down?" and were scored 0 (no), 2 (yes, but not in the last year), or

4 (yes, in the last year). The maximum score was 40, and a score of 7 or less indicated low-risk drinking, 8 to 15 indicated hazardous or harmful drinking, and 16 or more indicated high-risk drinking (harmful or dependent drinking).

Perceptions of partner drinking were measured via a 3-item scale constructed specifically for this study based on questions 1 and 10 from the AUDIT-10 measure. The constructed partner drinking measure asked the Veteran participants the following: 1) has your partner expressed concerns about your drinking, or suggested that you cut down? (yes, no), 2) how often does your partner have a drink containing alcohol? (no, monthly or less, 2 to 4 times a month, 2 to 3 times a week, 4+ times a week), and 3) how often do you and your partner have a drink containing alcohol together? (no, monthly or less, 2 to 4 times a month, 2 to 3 times a week, 4+ times a week). In the analyses, the answer options for questions 2 and 3 were recategorized because of low numbers: no and monthly or less became hardly ever, 2 to 4 times a month became sometimes, and 2 to 3 times a week and 4+ times a week became often.

Analysis

Socio-demographic characteristics were summarized using frequencies and unweighted percentages (categorical variables) or means and 95% confidence intervals (CI) (continuous variables), and were stratified by loneliness. A Pearson's correlation analysis was initially performed to explore the association between loneliness and quality-of-life domains. Linear regressions were then conducted to explore this further, with loneliness as the exposure variable to explore its relationship with quality-of-life domains and alcohol misuse (outcome variables). Model 1 explored the unadjusted association between loneliness and each outcome. Model 2 adjusted for both age and gender. Model 3 further adjusted for the other outcome variables (alcohol misuse and the remaining quality-of-life domains). These variables are commonly adjusted for each other in the literature.³⁴

The sample was then restricted to those who had a partner (i.e., marital status of married or in a relationship). Logistic regressions were conducted to explore the relationship between perceived partner drinking (exposure) and loneliness (outcome). Missing data were not included in analyses (complete case analysis). Statistical significance was defined as $p < 0.05$. Data processing was performed in Python version 3.5, and all analyses were performed using STATA MP 17.

RESULTS

In total, 163 participants met the eligibility criteria for this study. Table 1 summarizes the socio-demographic characteristics, military characteristics, and mental health outcomes of the participant sample. Most participants were male (92.6% vs. 7.4% female), were married or in a relationship (74.4% vs. 22.6% single/separated/divorced/widowed), consumed alcohol at hazardous/harmful or high-risk/dependent levels (78.5% vs. 21.5% low risk) and the majority reported loneliness (65.6% vs. 34.4% not lonely). The mean length of military service of the sample was 14.2 years (95% CI, 12.8-15.5 years).

Table 1 also presents perceived partner drinking for the participants who reported being married or in a relationship ($n = 125$). Overall, 63.2% of participants reported their partner expressed concerns about their drinking. Participants perceived their partner to drink often (48.0%) versus sometimes (28.0%) or hardly ever (24.0%) and reported drinking with their partner often (51.2%), versus sometimes (25.6%) or hardly ever (23.2%).

Results from the Pearson's correlation analyses are reported in the Appendix, Table A1. There were moderate to strong negative correlations between loneliness and all quality-of-life domains. The strongest negative correlations were observed between loneliness and the psychological domain ($r(161) = -0.54, p < 0.001$) and between loneliness and the social relationships domain ($r(161) = -0.57, p < 0.001$).

Table 2 displays the associations between loneliness, quality of life, and alcohol misuse. The results of the unadjusted linear regressions showed those who were lonely reported significantly lower quality-of-life scores in all domains compared with those who were not lonely. Further, those who were lonely had a higher alcohol misuse score than those who were not lonely (average difference = 5.99; $\beta = 0.33$; 95% CI, 3.33-8.65). After adjusting for age and gender, these associations persisted. However, after further adjusting each model for other outcome variables (alcohol misuse and the remaining quality-of-life domains), only the associations between loneliness and the quality-of-life physical health domain (average difference = -0.98; $\beta = -0.18$; 95% CI, -1.68 to -0.19) and social relationships domain (average difference = -2.28; $\beta = -0.30$; CI, -3.25 to -1.31) remained statistically significant.

Table 3 presents the associations between perceived partner drinking and loneliness among participants who reported being married or in a relationship ($n = 125$). Results of the unadjusted logistic regressions showed no statistically significant associations between

Table 1. Socio-demographic and clinical characteristics stratified by loneliness

	Overall (N = 163)	Not lonely* (n = 58)	Lonely* (n = 107)
Age (years), mean (95% CI)	47.6 (45.6-49.6)	50.7 (47.6-53.9)	48.2 (46.3-50.0)
Gender, n (%)			
Male	151 (92.6)	48 (85.7)	103 (96.3)
Female	12 (7.4)	8 (14.3)	4 (3.7)
Marital status, n (%)			
Married/in a relationship	125 (74.4)	47 (83.9)	78 (72.9)
Single/separated	23 (13.7)	2 (3.6)	21 (19.6)
Divorced/widowed	15 (8.9)	7 (12.5)	8 (7.5)
Length of service, mean (95% CI)	14.2 (12.8-15.5)	14.0 (11.6-16.1)	14.3 (12.6-15.9)
Alcohol misuse caseness, n (%)			
Low risk	35 (21.5)	22 (39.3)	13 (12.2)
Hazardous/harmful	55 (33.7)	19 (33.9)	36 (33.6)
High risk/dependent	73 (44.8)	15 (26.8)	58 (54.2)
AUDIT score, mean (95% CI)	15.2 (13.9-16.6)	11.3 (9.4-13.2)	17.3 (15.6-18.9)
Quality of life, mean (95% CI)			
Physical health	12.4 (12.0-12.8)	14.1 (13.5-14.7)	11.4 (11.0-11.9)
Psychological	11.1 (10.7-11.5)	12.9 (12.2-13.5)	10.2 (9.8-10.5)
Social relationships	10.7 (10.2-11.3)	13.6 (12.7-14.5)	9.2 (8.7-9.8)
Environment	14.1 (13.6-14.5)	15.6 (15.1-16.2)	13.2 (12.7-13.8)

	Overall (N = 125)	Not lonely* (n = 47)	Lonely* (n = 78)
Partner expressed concerns about drinking, n (%) [†]			
No	46 (36.8)	19 (40.4)	27 (34.6)
Yes	79 (63.2)	28 (59.6)	51 (65.4)
Perceived frequency of partner's drinking, n (%) [*]			
Hardly ever	30 (24.0)	8 (17.0)	22 (28.2)
Sometimes	35 (28.0)	15 (31.9)	20 (25.6)
Often	60 (48.0)	24 (51.1)	36 (46.2)
Drinking with partner, n (%) [†]			
Hardly ever	29 (23.2)	8 (17.0)	21 (26.9)
Sometimes	32 (25.6)	14 (29.8)	18 (23.1)
Often	64 (51.2)	25 (53.2)	39 (50.0)

*As measured by the 3-item UCLA Loneliness Scale.

[†]Restricted to those who were married/in a relationship.

AUDIT = Alcohol Use Disorder Identification Test.

perceived partner drinking and loneliness. After adjusting for age and gender, these findings persisted.

DISCUSSION

This study examined the associations between loneliness, quality of life, and alcohol misuse, and between perceived partner drinking and loneliness, among a sample of treatment-seeking UK Veterans. Overall, the study found Veterans who were lonely reported lower quality-of-life scores, particularly in the physical health and social relationships domains (after full adjustment), and higher alcohol misuse scores than non-lonely Veterans. The study revealed no significant associations between perceived partner drinking and loneliness.

Loneliness was highly prevalent among the present sample of treatment-seeking UK Veterans (65.9%). This figure appears to be lower than that reported in another study of treatment-seeking UK Veterans (79.1%)¹⁵ but higher than in studies of non-treatment-seeking populations (e.g., 27.0% in the UK general population³⁵ and 27.4% in UK community Veterans),¹⁹ all conducted at a similar timepoint. An explanation for this could have been the different data collection periods within the COVID-19 pandemic. While these high levels of loneliness are perhaps not unexpected, given the relationship between mental health difficulties and loneliness,^{36,37} it highlights the importance of including support to increase social connectedness within mental health treatments.

Table 2. Associations between loneliness (exposure), quality-of-life domains, and alcohol misuse (outcomes) (N = 163)

	Model 1 Average difference (β ; 95% CI; p value)	Model 2 Average difference (β ; 95% CI; p value)	Model 3 Average difference (β ; 95% CI, p value)
Quality-of-life domains			
Physical health	-2.66 (-0.48; -3.41 to -1.91; $p < 0.001$)	-2.73 (-0.50; -3.49 to -1.96; $p < 0.001$)	-0.98 (-0.18; -1.68 to -0.29; $p = 0.006$)
Psychological	-2.68 (-0.53; -3.34 to -2.03; $p < 0.001$)	-2.73 (-0.55; -3.39 to -2.06; $p < 0.001$)	-0.23 (-0.46; -0.80 to -0.33; $p = 0.421$)
Social relationships	-4.31 (0.57, -5.29 to -3.34; $p < 0.001$)	-4.43 (-0.58; -5.42 to -3.44; $p < 0.001$)	-2.28 (-0.30; -3.25 to -1.31; $p < 0.001$)
Environment	-2.40 (0.40; -3.25 to -1.55; $p < 0.001$)	-2.30 (-0.39; -3.16 to -1.45; $p < 0.001$)	0.52 (0.09; -0.32 to -1.35); $p = 0.223$)
Alcohol misuse score	5.99 (0.33; 3.33 to 8.65; $p < 0.001$)	5.64 (0.31; 2.93 to 8.36; $p < 0.001$)	2.44 (0.13; -0.99 to 5.87; $p = 0.163$)

Notes: CI = Confidence interval; β are standardized coefficients.

Model 1: Unadjusted association between loneliness and each outcome variable.

Model 2. Adjusted for age and gender.

Model 3. Further adjusted for alcohol misuse and all remaining quality-of-life domains.

Table 3. Associations between perceptions of partner drinking (exposure), and loneliness (outcome) (N = 125)

	Model 1 OR (95% CI, p value)	Model 2 AOR (95% CI, p value)
Partner expressed concerns about drinking		
No	Reference	Reference
Yes	1.28 (0.61 to 2.70; $p = 0.514$)	1.34 (0.61 to 2.92; $p = 0.467$)
Perceived frequency of partner drinking		
Hardly ever	Reference	Reference
Sometimes	0.48 (1.70 to 1.39; $p = 0.177$)	0.47 (0.16 to 1.40; $p = 0.176$)
Often	0.55 (0.21 to 1.42; $p = 0.216$)	0.63 (0.23 to 1.72; $p = 0.364$)
Drinking with partner		
Hardly ever	Reference	Reference
Sometimes	0.49 (0.17 to 1.43; $p = 0.192$)	0.45 (0.15 to 1.36; $p = 0.157$)
Often	0.59 (0.23 to 1.55; $p = 0.286$)	0.69 (0.25 to 1.88; $p = 0.468$)

Notes: Restricted to those married/in a relationship.

OR = odds ratio; CI = confidence interval; AOR = adjusted odds ratio.

Model 1: Unadjusted association between perceived partner drinking and loneliness.

Model 2. Adjusted for age and gender.

High rates of loneliness in this sample might potentially be explained by the challenging transition from military to civilian life as some Veterans find it difficult to integrate into civilian life and no longer feel part of the military family. Previous work highlighted a strong association between loneliness and more severe mental health presentations, although the direction of this relationship remains unclear.¹⁵ Those with mental health difficulties may limit social relationships to mitigate potential stigma, which then leads to social isolation and loneliness. Alternatively, it might be that loneliness is exacerbating mental health symptoms.

This study found those who were lonely reported lower scores on all quality-of-life domains, particularly

on the physical health and social relationships domains. This aligns with previous research that reported a significant correlation between quality of life and loneliness.³⁸ The relationship between physical health and loneliness is multifaceted. While poor physical health can increase the risk of loneliness because of problems with mobility, pain and distressing symptoms,³⁹ there is now also significant evidence that loneliness is a risk factor for several physical health symptoms, including high blood pressure⁴ and poor sleep.⁵ Alongside physical health, the association between social relationships and loneliness has also been explored in previous literature. Experiences of adverse social relationships, such as stressful interpersonal incidents, can have long-term

impacts on the individual, including on their later-life social relationships which either increase or reduce the risk of loneliness.⁴⁰

In line with findings of this study, previous research showed loneliness is associated with alcohol use disorder.^{17,41} One study from the United States reported 63.0% of adults ages 45 years or older, with a diagnosis of drug or alcohol use disorder, were lonely.⁴² Alcohol dependence and alcohol-related harm are more common among treatment-seeking UK Veterans, and the rates of alcohol misuse are higher than in the UK general population.¹⁸ Research suggests some UK Armed Forces personnel drink to cope with distressing thoughts and loneliness.¹⁷ Given that the sample used in this study signed up to test an alcohol reduction intervention and therefore were drinking above the recommended guidelines of 14 units per week, this may begin to explain the elevated levels of alcohol misuse, and therefore loneliness, in this sample.

This study found no significant associations between perceived partner drinking and loneliness. This is an underexplored area in existing literature. Despite the abundance of literature on the prevalence of alcohol misuse among Veterans, there is limited evidence about alcohol use/misuse among partners of military personnel and Veterans.²⁰ Of the evidence that does exist, which is dominated by research from the United States, female partners of military personnel are more than twice as likely as female partners in the general population to exhibit hazardous alcohol consumption and regular binge-drinking episodes.²⁰ However, there are substantial differences in the structure and processes of the U.S. and UK Armed Forces and, therefore, this cannot be generalized cross-culturally to the UK context. Military partners and families face unique challenges, such as frequently moving locations and coping with the stress and separation caused by deployment. Many partners and families cope well with these challenges; however, if they are struggling to manage them, alcohol may be used as a coping strategy.

Alcohol misuse is high among Veterans, and there is a concordance of alcohol consumption between couple members.⁴³ One UK study reported that, when compared to those who drink with military friends, military serving and ex-serving personnel who drink with a partner had significantly higher odds of frequent binge drinking.¹⁷ Therefore, it is important to explore perceived partner drinking in a military context, particularly among dual-serving military relationships (i.e., where both parties serve in the military), as it may pres-

ent as an additional risk factor for negative outcomes, such as loneliness.

Implications

The high prevalence of loneliness highlights the need for specialized support when leaving the armed forces, in particular, during the challenging transition out of the military to civilian life. As with the general population, innovative ways to tackle loneliness and increase social connectedness are needed, especially considering the COVID-19 pandemic, and should have a particular focus on those with mental health needs. As comorbidity appears to be the norm, rather than the exception, among treatment-seeking Veterans,¹⁵ clinicians and support workers should take a holistic approach by considering a range of health difficulties and environments that might also be at play (e.g., alcohol misuse and quality of life), rather than focusing on tackling loneliness in isolation. Individuals experiencing physical and mental health difficulties and alcohol misuse could be targeted for social prescribing measures to combat loneliness by encouraging them to access appropriate support such as community activities and social groups. Health care workers should consider, on a case-by-case basis, whether mainstream civilian services or specific armed forces services will best meet the needs of Veterans.

Future research should seek to replicate these findings in other treatment-seeking and non-treatment-seeking samples, and should explore the associations in different military services (e.g., Royal Navy, Army, and Royal Air Force) and serving status (e.g., serving personnel). It is suggested that future work should be conducted to explore the impacts of partner drinking on Veterans, particularly in the UK context. Future research should also consider further exploring the interplay between physical health, mental health, and loneliness.

Limitations

Limitations include the small sample size, limited number of female participants, and lack of ethnic diversity, meaning the generalizability of findings is limited. Additionally, the data were collected during the COVID-19 pandemic, including periods of lockdown and social distancing, which may have impacted the experience of loneliness. It is important to consider that the models used in this study may be subject to overadjustment bias if covariates adjusted for are on the causal pathway. For instance, it's plausible that quality of life explains the association between loneliness and alcohol misuse. However, these longitudinal pathways

cannot be explored because of the cross-sectional nature of these data.

The measure for perceived partner drinking was constructed specifically for this study and therefore is not a validated measure, making it difficult to compare with other research in the field. The measure records Veterans' perceptions of their partners' drinking, rather than the actual levels, which may influence the statistical relationship. All participants in the study were treatment-seeking Veterans; therefore, results cannot necessarily be generalized to non-treatment-seeking populations or to non-Veteran populations. Further, the use of only treatment-seeking Veterans means it is important to consider if a participant has or has not completed mental health treatment, as this might have impacted the findings.

More than 2,700 individuals were invited to take part in the main study (from which data were drawn and analyzed), with the majority not taking part. It is not possible to ascertain why these individuals chose not to take part. However, reasons could potentially include that data were collected via a smartphone or during the COVID-19 pandemic. Additionally, all participants self-reported military characteristics and treatment-seeking status, and it was not possible to verify status. Finally, all participants were Veterans who signed up to test a digital alcohol intervention app and therefore may reflect only those who were trying to manage or reduce alcohol consumption.

Conclusion

This study found loneliness was associated with poorer quality of life (particularly physical health and social relationship domains) and higher alcohol misuse. Innovative ways to reduce loneliness and improve social connectedness are needed in the Veteran population, particularly for those with mental health needs.

AUTHOR INFORMATION

Charlotte Williamson, BSc (Hons), MSc, is a doctoral student at King's Centre for Military Health Research (KCMHR), King's College London. Her PhD seeks to explore self-harm and suicide behaviours in the UK Armed Forces. Before commencing her PhD, she worked as a Research Assistant across several research projects in the field of military mental health, at both Combat Stress and KCMHR. Her research interests include self-harm and suicidality, military mental health, and the use of digital technology in mental health care.

Alice Wickersham, BSc (Hons), MSc, PhD, is an ADR UK (ESRC) research fellow at CAMHS Digital Lab, King's College London. Her research interests include using epidemiological methods and administrative data linkages to investigate issues affecting children, adolescents, and young people, particularly intersections between mental health, education, and criminal justice. She undertook her PhD at King's College London; preceding this, she was a Research Assistant at King's Centre for Military Health Research and Anna Freud National Centre for Children and Families.

Marie-Louise Sharp, BA (Joint Hons OXON), MPhil (OXON), PhD, is a senior research Fellow at the King's Centre for Military Health Research at King's College London. She is a mixed-methods researcher and has expertise in psychological medicine and epidemiology. Her research interests include military mental health, help-seeking behaviours, and the health and well-being of first responders.

Danielle Dryden, BSc (Hons), is a master's student in the War and Psychiatry program at King's College London. She has a particular interest in the impact of military service on military families.

Amos Simms, BSc (Hons), MSc, is a mental health nurse and psychotherapist and is currently employed as the Head of the Academic Department of Military Mental Health within the UK Armed Forces. His role is to ensure the military continues to have a strong evidence base underpinning its mental health delivery, including treatment, prevention, and health promotion interventions. He is currently undertaking a PhD looking at the impact of remote warfare on the mental health of military personnel.

Nicola T. Fear, BSc (Hons), MSc, DPhil (OXON), holds a Chair in Epidemiology at the Academic Department of Military Mental Health and is Director of the King's Centre for Military Health Research at King's College London. She has worked in the field of occupational health throughout her career, including within the UK Ministry of Defence as its consultant epidemiologist. Fear trained in epidemiology at the London School of Hygiene and Tropical Medicine and the University of Oxford.

Dominic Murphy, MA (Hons), PhD, DCLinPsy, is a consultant clinical psychologist and clinical academic. He is an expert in psychological trauma and has extensive experience caring for, and conducting research with, traumatized populations. He is Head of Research at Combat Stress, the current president of the UK Psychological Trauma Society, a director for the European Society for Traumatic Stress Studies, and Trustee and Director of Research at Forces in Mind Trust, and a senior member of King's Centre for Military Health Research at King's College London.

Laura Goodwin, BSc (Hons), MSc, PhD, AFHEA, is a Senior Lecturer in Mental Health in the Division of Health Research at Lancaster University. She conducts research on the comorbidity of mental health and alcohol problems,

with specific expertise in understanding the complexity of these issues in trauma-exposed populations, such as in military Veterans.

Daniel Leightley, BSc (Hons), MSc, PhD, AFHEA, is a research fellow at the King's Centre for Military Health Research where he joined in 2015. He leads a program of research focused on the interface between physical and mental health using digital technology, secondary data sources and big data analytics.

COMPETING INTERESTS

D Murphy is a trustee for the Forces in Mind Trust (the funder of this project) and is employed by Combat Stress, a national charity in the United Kingdom that provides clinical mental health services to Veterans. NT Fear sits on the Independent Group Advising on the release of patient data at NHS Digital. NT Fear is also a trustee of a military-related charity. NT Fear is partly funded by the United Kingdom's Ministry of Defence. A Simms is a full-time member of the UK Armed Forces seconded to King's College London. D Leightley is a reservist in the UK Armed Forces; this work has been undertaken as part of his civilian employment. M-L Sharp is funded by the Office for Veterans' Affairs, Cabinet Office, UK Government.

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CONTRIBUTORS

Conceptualization: C Williamson, ML Sharp, D Murphy and D Leightley

Methodology: C Williamson, A Wickersham, and D Leightley

Software: D Leightley

Validation: D Leightley

Formal Analysis: C Williamson, A Wickersham, and D Leightley

Investigation: C Williamson, A Simms, NT Fear, D Murphy, L Goodwin, and D Leightley

Resources: C Williamson, D Murphy, and D Leightley

Data Curation: D Leightley

Writing — Original Draft: C Williamson

Writing — Review & Editing: C Williamson, A Wickersham, M-L Sharp, D Dryden, A Simms, NT Fear, D Murphy, L Goodwin, and D Leightley

Visualization: C Williamson and D Leightley

Supervision: D Murphy and D Leightley

Project Administration: C Williamson and D Leightley

Funding Acquisition: NT Fear, D Murphy, L Goodwin, and D Leightley

ETHICS APPROVAL

This study was approved by King's College London, London, United Kingdom on Apr. 2, 2020. Ethics Reference HR-19/20-17438.

INFORMED CONSENT

N/A

REGISTRY AND REGISTRATION NO. OF THE STUDY/TRIAL

This study was registered on Jul. 7, 2020, under the registration no. NCT04494594. The registry can be found online at <https://clinicaltrials.gov/ct2/show/NCT04494594>.

ANIMAL STUDIES

N/A

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PEER REVIEW

N/A

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APPENDIX

Table A1. Pearson's correlations between loneliness and quality of life domains

Variable	Lonely	Physical health	Psychological	Social relationships	Environment
Lonely	1.00				
Physical health	-0.48*	1.00			
Psychological	-0.54*	0.71*	1.00		
Social relationships	-0.57*	0.45*	0.69*	1.00	
Environment	-0.40*	0.61*	0.65*	0.58*	1.00

* $p < 0.001$.