Associations Between Post-Traumatic Stress Disorder, Quality of Life And Alcohol Misuse Among UK veterans

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Abstract

Prior research has shown that those with Post-Traumatic Stress Disorder (PTSD) have persistent reductions in quality of life (QoL), and higher rates of alcohol misuse. As such, it is important that we explore QoL and alcohol misuse on PTSD diagnosis. Therefore, the aim of this study was to assess the association between PTSD, QoL and alcohol misuse among United Kingdom (UK) veterans. 163 UK veterans who sought help for a mental health disorder were recruited to take part. Linear regressions were used to assess the association between probable PTSD, QoL and alcohol misuse. Pearson's correlation analyses were used to assess the relationship between PTSD symptom clusters and QoL domains. We found unadjusted regressions showed evidence that, compared to those without PTSD, those with PTSD had

lower QoL scores on physical health, psychosocial, social relationships and environment domains. Adjusting for age, sex, and outcome variables, only associations with the physical health domain and psychosocial domain remained statistically significant. Correlation analyses between PTSD and QoL domains showed the strongest negative correlations between the functional impairment and physical health domain, and between the functional impairment and psychosocial domain. We found that those with probable PTSD had lower QoL and higher alcohol misuse scores.

Keywords: *veteran, armed forces, PTSD, alcohol misuse, quality of life, digital technology, physical health, social relationship, mental health*

Introduction

There is considerable evidence that indicates a higher prevalence of mental health issues among serving personnel and veteran communities when compared with the general population (Rhead et al. 2020; Stevelink et al. 2018). It is estimated that between 7% to 22% of United Kingdom (UK) veterans experience a mental health issue, sometimes occurring as a result of operational experiences, but often relating to stressors not linked with military service (Dickstein et al. 2015; Greenberg et al. 2011). UK veterans with poor mental health are at an increased risk of social exclusion compared to their peers (Iversen et al. 2005). Currently, research suggests that one in three UK serving personnel or veterans with a mental health issue seek formal mental healthcare (Stevelink et al. 2019), with help-seeking being influenced by sociodemographic factors, military characteristics, and symptoms of mental disorders (Hines et al. 2014; Iversen et al. 2010).

Current research efforts have focused on large-scale studies of military populations as a whole, with very little attention focused on the veteran community who seek formal healthcare (Fear et al. 2010; Murphy et al. 2017; Stevelink et al. 2018). In the context of the UK, only one study, has described the profile of veterans who sought support for mental health difficulties from a charitable organisation specialising in military mental health (Murphy et al. 2017). In this study, the authors found that Post-Traumatic Stress Disorder (PTSD) was the most frequently endorsed mental health difficulty, followed by problems with anger, Common Mental Health Difficulties (CMDs) and alcohol misuse. This compares with one large-scale cohort study which found that CMDs, such as anxiety and depression, were the most prevalent mental health difficulty suffered by veterans (Stevelink et al. 2018). Outside of the UK, PTSD has also been reported as the most prevalent disorder that veterans seek support for in Canadian and Australian samples (Mark et al. 2019; Thompson et al. 2016). To meet the criteria for PTSD as defined by the International Classification of Diseases (version 11), an individual needs to have endorsed experiencing problems on three clusters of symptoms; re-experiencing, avoidance and current sense of threat (World Health Organisation 2019).

PTSD is a debilitating condition with the long-term impact in military samples well documented (Murphy et al. 2021). Research has previously shown that PTSD is associated with increased likelihood of transition out of the military and social exclusion (Iversen et al. 2005; Karstoft et al. 2015). However, while it is acknowledged that PTSD is a direct and indirect contributor to other negative mental health symptoms, there is little understanding of the role of quality of life (QoL) domains and alcohol misuse in veterans who have PTSD and have sought help.

In the UK veteran community as a whole, research indicates that those with PTSD have persistent reductions in QoL, and higher rates of alcohol misuse (Murphy and Turgoose 2019). Therefore, the aim of this study was to assess the association between PTSD, QoL and alcohol misuse among UK veterans. Secondary aims sought to explore the associations between QoL domains with PTSD symptom clusters.

Methods

Data source and participants

This is a secondary analysis using cross-sectional baseline data collected from *omitted for manuscript anonymisation*. Participants were required to meet the following eligibility criteria: 1) own a smartphone, 2) sought help for a mental health disorder, 3) served at least one day in the UK Armed Forces. In total, 163 participants met the eligibility criteria and were recruited between 1st October 2020 and 31st April 2021. Participants were recruited either via *omitted for manuscript anonymisation*, a research cohort or social media advertisements. All participants recruited for this study confirmed that they had sought help from a medical doctor or charity for a mental health disorder.

Each participant was asked to download *omitted for manuscript anonymisation*. Once they had downloaded the app, they were asked to complete a baseline questionnaire which includes questionnaires asking about demographics, mental health and lifestyle. Following this, participants could use the app as much or as little as they found helpful. For the current study, data was restricted to the measures completed by participants at baseline.

This study was approved by the local ethics committee of committee of *omitted for manuscript anonymisation*. All participants have provided informed consent.

Measures

Quality of Life: The World Health Organization Quality of Life-BREF (WHOQOL-BREF) (The World Health Organisation Qualoty of Life Group 1998) is a 26-item self-report questionnaire which evaluates the context of an individual's culture, value systems, personal goals, standards, and concerns. The WHOQOL-BREF provides a score between 4 and 20, with higher scores indicating better QoL, for the following domains: physical health, psychological, social relationships, and environment. The WHOQOL-BREF consists of 26 items and has been reported to show satisfactory internal consistency (Cronbach's α ranging from 0.66 for the social domain to 0.82 for physical health). It also has adequate test–retest reliability and discriminant validity (The World Health Organisation Qualoty of Life Group 1998).

Post-Traumatic Stress Disorder Symptoms: The International Trauma Questionnaire (ITQ) (Cloitre et al. 2018) measures International Classification of Diseases-version 11 (ICD-11) symptoms of PTSD and also additional symptoms of Complex PTSD. For the purposes of this study, a reduced version of the ITQ was used to assess for PTSD symptoms only. The ITQ is a 9-item self-report measure of ICD-11 PTSD, based on a total of six symptoms across the three symptom clusters of re-experiencing, avoidance, and sense of threat (each symptom cluster comprises two symptoms). A diagnosis of probable PTSD requires the endorsement of one of two symptoms from each symptom cluster, and endorsement of at least one indicator of functional impairment associated with these symptoms. The psychometric properties of the ITQ, which include re-experiencing of the trauma, avoidance of internal or external trauma

reminders, and sense of current threat, have been demonstrated in general populations (Ben-Ezra et al. 2018) and the UK veteran community (Murphy et al. 2020).

Alcohol Misuse: The Alcohol Use Disorder Identification Test (AUDIT; Saunders et al. 1993) is a 10-item self-report measure assessing alcohol related harm. Each question has five response options scored from 0 to 4, except for questions 9 and 10, which only have three response options scored 0, 2 and 4. A total score between 0 to 7 indicates low risk drinking, 8 to 15 indicates hazardous drinking, and 16 or more indicates high risk harmful drinking.

Statistical analysis

Socio-demographic characteristics were summarised using frequencies and unweighted percentages (categorical variables) or means and 95% confidence intervals (continuous variables) stratified by probable PTSD diagnosis. To compare the association between probable PTSD diagnosis, QoL domains and alcohol misuse score, linear regression models were conducted with probable PTSD as the exposure variable. Model 1 explored the unadjusted association between PTSD and each outcome of interest. Model 2 adjusted these regressions for age and sex. Model 3 further adjusted for all other outcome variables. To explore the association between PTSD symptom clusters and QoL domains, Pearson's correlation analyses were performed. There was no missing data. Statistical significance was defined as a *p*-value of less than 0.05. Data processing was performed in Python version 3.5. All analyses were performed using STATA MP 17.

Results

Socio-demographics and clinical characteristics

The socio-demographic and clinical characteristics of the sample are described in Table 1. Overall, most of the sample were male (*n*=151, 92.6%), endorsed white ethnicity (*n*=162; 99.4%), had an average service length of 14.2 years (95% CI: 12.8 to 15.5), consumed alcohol at a hazardous level (*n*=55; 33.7%) or harmful (*n*=73; 44.8%), and had no PTSD (*n*=95; 58.3%). Stratifying by probable PTSD diagnosis, those with probable PTSD appeared to score higher on the AUDIT and lower on the QoL domains than those with no PTSD.

INSERT TABLE 1 HERE

Associations between PTSD, quality of life and alcohol misuse

The results of the unadjusted linear regressions (see Table 2) showed strong evidence that, compared to those without PTSD, those with probable PTSD had lower QoL scores on physical health (B=-0.52; $p<0.001$), psychosocial (B=-0.55; $p<0.001$), social relationships (B=-0.40; $p<0.001$) and environment domains (B=-0.44; $p<0.001$).

Further, the analysis showed that, compared to those without PTSD, those with probable PTSD had a higher alcohol misuse scores (B=0.25; $p=0.001$). These associations persisted after adjusting the models for age and sex. Finally, after adjusting for all outcome variables, only associations with the physical health domain (B=-0.17; $p=0.004$) and psychosocial domain (B=-0.12; $p=0.023$) remained statistically significant.

INSERT TABLE 2 HERE

Correlation analyses

An overview of the correlations between PTSD symptom clusters and QoL domains are described in Table 3. Within these measures, there was a strong positive correlation between all PTSD symptom clusters, and between all QoL domains. Between these measures, there were strong negative correlations between PTSD symptom clusters and QoL domains. The strongest negative correlations were observed between the functional impairment and physical health domain ($r(161)=-0.57$; $p=0.001$), and between the functional impairment and psychosocial domain ($r(161)=-0.60$; $p=0.001$).

INSERT TABLE 3 HERE

Discussion

In this study, we examined the associations between probable PTSD, QoL and alcohol misuse among UK veterans. Overall, we found that after adjustment veterans who had probable PTSD reported lower QoL scores for physical health and psychosocial domains. This was further supported by the strong negative correlations between each of the PTSD symptom clusters, and each of the QoL domains. Three domains demonstrated strong negative correlations between PTSD symptoms, indicating strong relationship between the PTSD measure (ITQ questionnaire) and QoL (WHOQOL-BREF questionnaire).

This study found that after adjusting for age and sex, those with probable PTSD reported lower physical health and psychosocial QoL scores. This finding is consistent with findings of prior studies exploring UK veteran and civilian populations which show a strong correlation between improved QoL and fewer PTSD symptoms (Schnurr and Lunney 2016). This study further explored the association between PTSD symptom domains (as defined by ITQ), and QoL domains (as defined by WHOQOL-BREF). These analyses demonstrated a strong positive correlation between all PTSD symptom clusters, and between all QoL domains; indicating the internal validity of each measure domain. It is interesting to note that QoL physical health and psychosocial domains remained significant in our fully adjusted model and were also the strongest correlated with functional impairment symptom cluster.

As this study represents a sample of veterans who sought help for a mental health difficulty, future work should explore this construct in further detail. Further, it is important to consider if a participant has, or has not completed mental health treatment, and the impact this may have on our findings. Between each measure there were also strong negative correlations between

PTSD symptom and QoL domains. This may indicate a relationship exists between QoL and symptom measures. Future research needs to explore to what extent improved QoL across each domain has a meaningful relationship with PTSD symptoms, including longitudinally.

Rates of alcohol misuse in the UK Armed Forces are higher than the general public (Rhead et al. 2020; Stevelink et al. 2018), with the connection between alcohol misuse and PTSD being well established (Murphy et al. 2017). This study found that there was an association between alcohol misuse scores and probable PTSD diagnosis, with those meeting criteria for PTSD reporting on average an AUDIT score 4.46 points higher compared with those without probable PTSD. This association has been found previously in military populations (Iversen et al. 2010; Rhead et al. 2020; Stevelink et al. 2018).

Veterans who seek help are reporting potentially harmful levels of alcohol misuse compared to the wider UK military (Stevelink et al. 2019). Tentative evidence is emerging suggesting a relationship between specific symptoms of PTSD and alcohol misuse that appear to be driving this association, particularly increases in risk-taking behaviour often cited as being used as maladaptive coping strategies to manage symptoms (McGlinchey et al. 2021). This has clear impact on treatment outcomes for PTSD, and further research is required to develop awareness of risky drinking behaviours and promote positive behaviour change strategies.

Our findings demonstrate the role of QoL and alcohol misuse in UK veterans with PTSD. Previous work has shown that those with PTSD have poorer outcomes than other populations seeking help (Murphy et al. 2017). This may be due to treatment being focused solely on the symptoms of PTSD and failing to take a holistic approach where a range of other mental health difficulties and environments are considered. One method to delivering a more holistic

approach could be the use of digital technology in combination with traditional face-to-face treatment (Wickersham et al. 2019). However, further work is required to assess the efficacy, usability and acceptability of digital technology and this will be the focus of future work using this sample.

Several limitations of this study should be noted. First, our findings should be replicated using veteran populations from other nations as well as active duty personnel. Generalizability of our findings is limited because of our small sample size, limited number of females and lack of ethnic diversity. Second, it is important to acknowledge that our models may be subject to overadjustment bias if covariates adjusted for are on the causal pathway. The effects in different military services (e.g. Army, Royal Air Force) would also be an important consideration, as they may result in varying chronic PTSD symptoms. Third, more than 2,700 participants who were invited to take part in the main study (where data was drawn from for the analyses presented in this work), with the majority not taking part. It is not possible to ascertain why these individuals chose not to take part, but it could be due to the data being collected via a smartphone or Coronavirus (Covid-19) pandemic. Finally, participants self-identified their military and help-seeking status. We were unable to verify their status.

In conclusion, we found that probable PTSD is associated with lower QoL and higher alcohol misuse. As suggested by others (Schnurr and Lunney 2016), further research should be undertaken to explore how meaningful clinical significance of PTSD symptoms maps onto QoL and alcohol misuse. Further novel approaches, such as the use of digital technology, to expand reach should also be considered.

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Table 1: Sociodemographic and clinical characteristics stratified by probable post-traumatic stress disorder.

Characteristics	Overall *n*=163	No PTSD[1] *n*=95	Probable PTSD[1] *n*=68
Age (mean, 95% CI)	47.6 (45.6 to 49.6)	50.4 (48.2 to 52.7)	47.1 (44.74 to 49.4)
Gender (n, %)			
Male	151 (92.6)	86 (90.5)	65 (95.6)
Female	12 (7.4)	9 (9.5)	3 (4.4)
Ethnicity (n, %)			
White	162 (99.4)	94 (99.0)	68 (100.0)
Other	1 (0.6)	1 (1.1)	-
Length of service (mean, 95% CI)	14.2 (12.8 to 15.5)	12.8 (12.1 to 15.5)	14.7 (12.6 to 16.8)
Alcohol misuse caseness (n, %)	35 (21.5)	25 (26.3)	10 (14.7)
Low	55 (33.7)	36 (37.9)	19 (27.9)
Hazardous	73 (44.8)	34 (35.8)	39 (57.4)
Harmful			
AUDIT score (mean, 95% CI)	15.2 (13.9 to 16.6)	13.4 (11.8 to 15.0)	17.8 (15.6 to 20.0)
Quality of life domains (mean, 95% CI)			
Physical health	12.4 (12.0 to 12.8)	13.5 (10.1 to 14.0)	10.7 (10.2 to 11.2)
Psychosocial	11.1 (10.7 to 11.5)	12.2 (11.8 to 12.7)	9.5 (9.14 to 9.9)
Social relationships	10.7 (10.2 to 11.3)	11.9 (11.2 to 12.6)	9.0 (8.2 to 9.8)
Environment	14.1 (13.6 to 14.5)	15.1 (14.6 to 15.6)	12.6 (11.9 to 13.3)
PTSD symptom caseness (n, %)			
Re-experiencing	95 (58.3)	27 (28.4)	68 (100.0)
Avoidance	85 (52.2)	17 (17.9)	68 (100.0)
Sense of current threat	100 (61.4)	32 (33.7)	68 (100.0)
Functional impairment	85 (52.2)	17 (17.9)	68 (100.0)

[1]As measured by the International Trauma Questionnaire.

Table 2: Results of linear regression models examining the association between PTSD (exposure), quality of life domains and alcohol misuse (outcomes) (n=163).

	Model 1	Model 2	Model 3
	Average difference (Beta, 95% CI; *p* value)	Average difference (Beta; 95% CI; *p* value)	Average difference (Beta; 95% CI; *p* value)
Quality of life domains			
Physical health	-2.80 (-0.52; -3.50 to -2.10; p<0.001)	-2.89 (-0.54; -3.60 to -2.19; p<0.001)	-0.93 (-0.17; -1.56 to -0.30; p=0.004)
Psychosocial	-2.67 (-0.55; -3.29 to -2.05; p<0.001)	-2.64 (-0.55; -3.27 to -2.01; p<0.001)	-0.58 (-0.12; -1.08 to -0.08; p=0.023)
Social relationships	-2.94 (-0.40; -3.98 to -1.90; p<0.001)	-2.91 (-0.39; -3.97 to -1.84; p<0.001)	-0.27 (-0.03; -1.27 to 0.72; p=0.582)
Environment	-2.52 (-0.44; -3.32 to -1.72; p<0.001)	-2.36 (-0.41; -3.16 to -1.55; p<0.001)	-0.04 (-0.01; -0.81 to 0.72; p=0.908)
Alcohol misuse score	4.46 (0.25; 1.84 to 7.09; p=0.001)	4.02 (0.23; 1.36 to 6.67; p=0.003)	0.677 (0.03; -2.47 to 3.83; p=0.672)

Model 1: Unadjusted association between post-traumatic stress disorder and each outcome variable.
Model 2: Adjusted for age and sex.
Model 3: Further adjusted for all other outcome variables.
Abbreviations: CI: Confidence Interval.
Note: Betas are standardised coefficients.

Table 3: Pearson's correlation analysis exploring the association between post-traumatic stress disorder symptom clusters and quality of life domains.

Variable	1	2	3	4	5	6	7	8
1. Re-experiencing	-							
2. Avoidance	.71*	-						
3. Sense of current threat	.58*	.53*	-					
4. Functional impairment	.68*	.80*	.68*	-				
5. Physical health	-.48*	-.53*	-.44*	-.57*	-			
6. Psychosocial	-.50*	-.55*	-.51*	-.60*	.71*	-		
7. Social relationships	-.31*	-.37*	-.36*	-.45*	.50*	.69*	-	
8. Environment	-.35*	-.47*	-.40*	-.41*	.61*	.65*	.58*	-

*Denotes statistically significant result ($p<0.05$).