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Suicide bereavement and loneliness among UK Armed Forces veterans under the care of mental health services: Prevalence and associations

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ABSTRACT

Suicide bereavement is a risk factor for suicide and psychiatric illness. Its lifetime prevalence in the general population is estimated at 22%, and in one (US) veteran sample as 47%, but no estimates exist for a UK veteran sample. We aimed to measure the lifetime prevalence of suicide bereavement in a clinical sample of UK veterans to inform service provision for this group. Our secondary aim was to measure the prevalence of loneliness and investigate the association between suicide bereavement and loneliness. We searched the routine electronic clinical records of all veterans treated in a London veterans' crisis care service over the period September 2021 to June 2022 (n=69), capturing data on their sociodemographic and clinical characteristics, including the proportions recorded as having experienced the suicide of a friend or relative and as experiencing loneliness. We used multivariable logistic regression models to test for an association of suicide bereavement with loneliness. The lifetime prevalence of suicide bereavement was 30% (predominantly of friends) and the period prevalence of loneliness was 57%. There was no association of suicide bereavement with loneliness. This work highlights the high proportion of veterans in this clinical sample with two specific suicide risk factors, and their likely needs for specific support to address the psychological consequences of suicide loss.

Introduction

Suicide bereavement describes the period of grief, mourning and adjustment after a suicide death that is experienced by relatives, friends and any other contacts of the deceased affected by the loss (Pitman et al., 2014). It is an established risk factor for suicide and psychiatric illness (Pitman et al., 2014). Consequently, suicide prevention strategies in numerous high-income countries, including that for England, recommend the provision of support for people bereaved by suicide (DHSC, 2021). For public health agencies to respond to the need for suicide bereavement support it is important they have reliable estimates of the prevalence of exposure to suicide loss. Such estimates are likely to vary according to definitions used for kinship or closeness to the deceased, with the tightest definitions limited to first-degree relatives and the broadest definitions including colleagues and friends. There are a number of reasons why broad definitions are more appropriate in capturing the true burden of suicide bereavement. Firstly, the closeness of an emotional attachment may be more important than kinship *per se* (Cerel et al., 2014; van de Venne et al., 2017). Secondly, risk of suicide attempt is of a similar magnitude whether a suicide-bereaved person is related to the deceased or not (Pitman et al., 2016a). Thirdly, suicide can have substantial emotional impacts even on people who appear to be at the periphery of social networks (Brent et al., 1996; Pitman et al., 2018a), perhaps because social contacts outside the immediate family may be overlooked in relation to offers of support (Pitman et al., 2018a). Finally, the probability of high guilt scores relating to a suicide death is of a greater magnitude among non-relatives of the deceased then among relatives (Pitman et al., 2016b), contributing to distress. It is therefore important to consider a range of kinship groups, particularly non-relatives, when estimating the prevalence of suicide bereavement.

Previous estimates of the prevalence of suicide bereavement have been as high as 51% in a US general population sample and 58% in an Australian general population sample (Maple et al., 2019). A 2017 meta-analysis of 18 population-based studies provided pooled estimates of past-year and lifetime prevalence of exposure to suicide among family, friends/peers, and all other relationships to the deceased

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(Andriessen et al., 2017). This estimated a pooled past-year prevalence of 4.31% (CI: 2.50 to 6.58) and lifetime prevalence of 21.83% (CI: 16.32 to 27.90), with values significantly higher for friends and peers than for relatives. Studies identified in this review were all from high-income countries, and primarily from the US (10 of18), with none from the UK. Methodological problems identified by the review authors included the biases (selection, response, and social desirability) introduced through sampling methods such as random digit dialing telephone surveys of a weighted population sample (Cerel et al., 2016), adolescent longitudinal surveys (Feigelman and Gorman, 2008; Swanson and Colman, 2013), and student surveys conducted on university campus (Westefeld et al., 2005).

Whilst population-based prevalence estimates are valuable for public health agencies in planning provision of services, it is also important to establish these in specific populations, particularly those at potentially higher risk of suicide exposure. These include psychiatric patients and their families, first responders to a suspected suicide (typically emergency services), and military personnel, whether serving or ex-serving (veterans). Veterans are a population of interest given concerns about their mental health that relate to pre-enlistment adversities, traumatic experiences during training or deployment, and difficulties adjusting to civilian life. High rates of suicide have been reported in US military personnel and veterans (Hoge and Castro, 2012) with a clear excess risk of suicide in veterans compared with non-veterans, particularly in men aged 18 to 34 years (Carroll et al., 2020). Conversely, suicide rates for UK armed forces personnel are lower than those for the general population (MoD, 2020), as are those for UK veterans (Roberts et al., 2023). However, suicide rates for UK veterans aged under 25 years are two to four times higher than those for general population peers (Rodway et al., 2023), as consistent with findings for earlier periods (Kapur et al., 2009). Evidence also shows that the risk of lifetime suicidal thoughts is higher in female (but not male) UK veterans and non-veterans (Woodhead et al., 2011), and that the risk of self-harm and attempted suicide is significantly higher in UK veterans than in serving military personnel (Pinder et al., 2012). We need to improve our understanding of suicide risk factors among veterans in order to plan appropriate responses.

Likely suicide risk factors in veterans include deployment trauma (Hoge and Castro, 2012), socio-economic disadvantage (Stanley et al., 2022), post-traumatic stress disorder (PTSD) (Stevelink et al., 2018), substance misuse (Stevelink et al., 2018) and loneliness or social isolation (Stapleton, 2018). Loneliness describes the perception that one's network of social relationships is deficient either quantitatively or qualitatively (de Jong Gierveld, 1998), whilst social isolation is defined objectively as a lack of meaningful social contacts. Each are associated with suicide (Näher et al., 2020; Shaw et al., 2021). There are many reasons why veterans describe feeling lonely, including moving to a new area, transitioning to civilian roles, adjusting to physical injury, and relationship breakdown (Stapleton, 2018). Among the UK armed forces community, a quarter report feeling lonely or socially isolated and bereavement is cited as the most common cause of loneliness (Stapleton, 2018). Loneliness in US veteran populations is associated with risk of suicide attempt (Porter et al., 1997), as it is in non-veteran samples (McClelland et al., 2020). Among people who have experienced sudden bereavement, loneliness is associated with suicidality (Pitman et al., 2020b), and substance misuse is common (Pitman et al., 2020a). These findings could help explain the high prevalence of substance misuse among veterans treated in mental health services (Murphy and Turgoose, 2019). Estimating the prevalence and correlates of suicide bereavement in veterans is therefore important before identifying appropriate veteran-sensitive interventions.

There are no current estimates of the prevalence of exposure to suicide bereavement in a UK veteran sample, and only one estimate for a US sample, which found a similar (Andriessen et al., 2017) prevalence in veterans (46.9%) and non-veterans (48.5%) in one US state (Cerel et al., 2016, 2015). Suicide-bereaved veterans in this sample were more likely than unexposed veterans to have depression, anxiety and suicidal ideation (Cerel et al., 2015). In the current study we aimed to estimate the prevalence and key correlates of suicide bereavement in a clinical sample of veterans to better understand the clinical needs of this patient population. Our secondary aim was to measure the prevalence of loneliness and test the hypothesis that veterans exposed to suicide bereavement were more likely than those unexposed to express loneliness.

Methods

Study design

We conducted a cross-sectional study of UK veterans, defined as individuals who had served in the UK armed forces for at least one day.

Sample

We collected socio-demographic and clinical data, including lifetime suicide bereavement exposure, on all patients referred to the High Intensity Service (HIS) within the Veterans' Mental Health Service for London from the HIS team inception (10/9/20) to the date of data collection (20/6/2022).

The HIS was commissioned by NHS England as one component of the London and South-East NHS Veterans' Mental Health Transition, Intervention and Liaison Service (TILS) and the Veterans' Mental Health Complex Treatment Service (CTS) (Bacon et al., 2022), now known as Op COURAGE. The service is intended for former UK Armed Forces personnel living in London who are in need of urgent mental health care and treatment, and have a high level of clinical need and risk. Team members provide support to veterans under their care for up to six months, working alongside any local NHS community, crisis or inpatient services involved and with third sector organisations (*e.g.* Walking With The Wounded, Stoll, The Ripple Pond). HIS therefore provides intensive, veteran-sensitive care to address the psychological and social issues that contribute to precipitating and perpetuating mental health crisis in veterans. Referrals to the HIS team arise from general practitioners, local mental health service providers, self-referral, and by internal referral from the TILS or CTS.

We excluded veterans who did not engage with or were not taken on by the HIS team, because their notes had insufficient clinical details and because our intention was to understand the needs of patients cared for by this specific team.

Data collection

We searched the electronic health records of patients under the care of the HIS team over this period using CareNotes, a patient record software system provided by Advanced. First, we collected data on the socio-demographic and clinical characteristics of our sample using two main approaches. We extracted data on gender, age, source of referral, length of military service, and specific armed force (British Army, Royal Navy, Royal Air Force, Royal Marines) using routine administrative records (referral forms).

We then reviewed the free-text clinical notes to collect data on: ethnicity (as this was more valid than *via* referral forms), marital status, whether or not they had children, recorded psychiatric diagnosis (for the current care episode), whether or not they misused alcohol or illicit drugs (based on clinical interview and observation of the home environment, including cannabis, cocaine, MDMA, heroin, crack, amphetamines, LSD, dimethyltryptamine), trauma history, whether or not they had been deployed to a combat zone whilst in military service, whether or not they were recorded as describing loneliness during this episode of care, and whether or not they were recorded as having had any lifetime history of suicidal thoughts or suicide attempt. Data for these variables were collected by a clinically qualified researcher (MLA) reviewing the notes and using clinically-informed text searches for specific terms:

ethnic*, White, Black, Caribbean, single, wife, child*, son, daughter, tour*, deploy*, diagnos*, PTSD, depress*, alcohol*, drug*, substance, cannabis, and lonel*.

We used the same text search approach to identify those with a lifetime history of suicide bereavement, agreeing a set of search terms on the basis of clinical experience and familiarity with clinical note-taking syntax. We created the following set of truncated search terms: bereave*, suicide*, dead, died, kill*, hung, hang*, funeral, lost. One researcher (MLA) searched the clinical notes using these terms, searching for each in chronological order until attempts were exhausted, and reading through key assessments to identify any other indicators of exposure to suicide. Wherever such a term was identified the researcher read the context of the notes to ascertain whether the patient had experienced lifetime suicide bereavement. Each suicide bereavement was classified by whether it was of a friend or a relative. We also recorded the number of suicide bereavements.

Any ambiguities in data collection were discussed with a second clinically qualified researcher (AP), who checked the clinical notes to validate data.

Statistical analysis

We established the lifetime prevalence of suicide bereavement and the period prevalence (during this episode of care) of loneliness over this episode of care. We then presented descriptive statistics describing other socio-demographic and clinical characteristics, both overall and comparing those exposed to suicide bereavement *versus* those not. To do this we ran bivariate analyses using unpaired t-tests and the Mann-Whitney U test for continuous variables, and chi-squared tests and Fisher's Exact tests for categorical variables.

Finally, we used multivariable logistic regression models to test the hypothesis that veterans with a history of suicide bereavement were significantly more likely to be documented as reporting loneliness during their episode of mental healthcare. We adjusted models for covariates agreed *a priori*, which were the two variables associated with both exposure and outcome: age and gender (Barreto et al., 2021; Bozzay et al., 2014).

All analyses were performed using SPSS version 21.0 (IBM Corp., 2012).

Ethical approval

As this work was conducted as a service improvement project intended to inform the service's responses to the needs of this clinical group, it did not require specific ethical approval.

Findings were discussed within HIS team meetings to explore clinical and policy implications and establish new screening protocols.

Results

Sample characteristics

We identified a total of 77 patients referred to the HIS team over the period from 10/9/2020 to 20/6/2022. We excluded 8 individuals who did not engage with the HIS team, which resulted in a final sample size of 69 veterans.

The prevalence of suicide bereavement in our sample of veterans was 30.4% (21/69), of which all were male. Of these, the proportion bereaved by the suicide of a relative was 23.8% (5/21) and by a friend was 90.5% (19/21), with an overlapping category of those bereaved by the suicides of both (14.3%; 3/21). The overall prevalence of bereavement by a relative's suicide was therefore 7.2% (5/69) and of bereavement by a friend's suicide was 27.5% (19/69). Due to inadequate detail in the notes, it was not possible to identify whether, among those bereaved by the suicide of a friend, the deceased had been a colleague in the military, a fellow veteran, or a civilian. The median number of suicide bereavements was 2 (maximum=8; IQR =1–3), but was likely to have been an under-estimate as we had to impute values of n=2 for the 3 people for whom we could not specify number of suicide bereavements due to plural references to "friends" or "colleagues" who had died by suicide. The prevalence of reported loneliness in our sample of veterans was 56.5% (39/69).

Socio-demographic and clinical characteristics of our sample are presented in Table 1, sub-classified by whether or not they had a lifetime history of suicide bereavement. Overall, the sample predominantly identified as male (67/69) and was in the age range 20–65 years (mean=45.7; SD=10.1). The ethnicity of the sample was predominantly White British (84.1%). There were no significant differences on any of the sample characteristics except for age, in that those bereaved by suicide were significantly younger (41.4 *versus* 47.5 years), and substance misuse, in that those bereaved by suicide were more likely to use multiple substances of misuse (38% *versus* 13%).

Association between suicide bereavement and loneliness

Veterans bereaved by suicide were no more likely to report feeling lonely than those unexposed to suicide bereavement, whether in unadjusted (β=0.727; 95% CI=0.255–2.074; p=0.551) or adjusted (β=0.670; 95% CI=0.224–2.01; p=0.475) regression models (Table 2).

Discussion

Main findings

In our clinical sample of veterans in treatment for mental health problems we identified a high lifetime prevalence of suicide bereavement (30%) relative to the 22% estimated for general population samples (Andriessen et al., 2017), and a high period prevalence of loneliness (57%). We also found that a greater proportion of those bereaved by suicide currently used multiple substances of misuse (38%), suggesting that they may be using these substances to self-medicate grief. Although we found no evidence to support our hypothesis that suicide bereavement was associated with loneliness, our prevalence estimates do identify a high level of social need in this population. This is in the context of the high prevalence of substance misuse among veterans treated in mental health services (Murphy and Turgoose, 2019).

Suicide bereavement was predominantly due to the suicide of friends rather than relatives. However, due to the limited power of interaction tests we were not able to investigate whether this (or other factors such as number of losses or time elapsed since loss) modified the main association. We noted that veterans bereaved by suicide were significantly younger than the non-suicide bereaved, suggesting that the trauma of suicide loss may have influenced age of presentation to mental health services. However, it was not possible to investigate whether the mental health problems they presented to the service with could be said to have arisen from the bereavement or not.

Findings in the context of other studies

Our prevalence estimate for suicide bereavement (30%) was higher than that derived from a recent meta-analysis of population-based studies (22%) (Andriessen et al., 2017). However, it was lower than that derived from the only other veteran (non-clinical US) sample: 47% (Cerel et al., 2016). It is possible that the low prevalence of suicide bereavement in our high-risk UK clinical sample compared with a non-clinical US sample relates to social and combat-related factors among US veterans, which may result in greater exposure among US veterans to suicide bereavement than for UK veterans. Another explanation is that the survey methods used in the US survey were more likely to elicit exposure to suicide bereavement (through direct questioning) than a study relying on analysis of routine clinical data. Suicide bereavement and loneliness have only relatively recently been

Table 1
Socio-demographic and clinical characteristics of the veteran sample.

	Total (n=69)		Suicide bereavement (n=21)		No suicide bereavement (n=48)		p-value
Age (years) – mean ± SD	45.7±10.6		41.4±10.1		47.5±10.3		**0.025**
Male gender - n (%)	67	(97.1)	21	(100)	46	(95.8)	0.481
Marital status - n (%)							0.651
Married	24	(34.8)	6	(28.6)	18	(37.5)	
Single	12	(17.4)	3	(14.3)	9	(18.8)	
Separated	33	(47.8)	12	(57.1)	21	(43.8)	
Number of children - median (IQR)	1	(1.0)	1	(1.0)	1.0	(1.0)	0.93
Ethnicity - n (%)							0.323
White	58	(84.1)	19	(90.5)	39	(81.3)	
Black	9	(13)	1	(4.8)	8	(16.7)	
Mixed race	2	(2.9)	1	(4.8)	1	(2.1)	
Service length - median (IQR)	7	(5–11)	7	(5–12)	7	(5–11)	0.619
0–5 years	27	(39.1)	7	(33.3)	20	(41.7)	0.291
6–10 years	23	(33.3)	7	(33.3)	16	(33.3)	
11–20 years	15	(21.7)	4	(19.0)	11	(22.9)	
more than 20 years	4	(5.8)	3	(14.3)	1	(2.1)	
Armed Forces - n (%)							0.903
British Army	57	(82.6)	17	(81.0)	40	(83.3)	
Royal Navy	4	(5.8)	1	(4.8)	3	(6.3)	
Royal Air Force	7	(10.1)	3	(14.3)	4	(8.3)	
Royal Marines	1	(1.4)	0	(0.0)	1	(2.1)	
History of deployment - n (%)	52	(78.8)	15	(75)	37	(80.4)	0.745
Number of deployments - median (IQR) †	1	(1–2)	1	(0.25–2.75)	1	(1–2)	0.865
Suicidal ideation - n (%)	60	(87.0)	20	(95.2)	40	(83.3)	0.258
Suicide attempts - median (IQR)	1	(0–2)	1	(0–2)	1	(0–1)	0.464
Misuse of alcohol - n (%)	44	(63.8)	16	(76.2)	28	(58.3)	0.156
Misuse of cannabis - n (%)	16	(23.2)	8	(38.1)	8	(16.7)	0.067
Misuse of both alcohol and cannabis - n (%)	4	(5.8)	3	(14.3)	1	(2.1)	0.081
Misuse of either alcohol or cannabis - n (%)	51	(73.9)	18	(85.7)	33	(68.8)	0.140
Multiple substances of misuse†† - n (%)	14	(20.3)	8	(38.1)	6	(12.5)	**0.023**
PTSD status - n (%)							1.000
no diagnosis of PTSD	20	(29)	6	(28.6)	14	(29.2)	
diagnosis of PTSD	43	(62.3)	13	(61.9)	30	(62.5)	
diagnosis of complex PTSD	6	(8.7)	2	(8.7)	4	(8.3)	
Loneliness reported – n (%)	39	(56.5)	13	(61.9)	26	(54.2)	0.551

PTSD = post-traumatic stress disorder; SD = Standard Deviation; IQR = Inter-quartile Range.
† solely for the 52 people who had been on deployment.
†† multiple substances of misuse was defined as any of the following combinations: alcohol and cannabis; alcohol and other drugs; cannabis and other drugs.

Table 2
Association between suicide bereavement and loneliness in a veteran sample.

Logistic regression model	β	95% CI	p-value
Unadjusted exponentiated coefficient	0.727	0.255–2.074	0.551
Adjusted† exponentiated coefficient	0.670	0.224–2.01	0.475

† adjusted for age and gender.

recognized as suicide risk factors and are not screened for (or recorded) routinely in UK clinical practice. It is possible that our approach to deriving exposure (and outcome) variables and our use of routine data may have resulted in an under-ascertainment of suicide bereavement and of loneliness.

We found that 28% of all veterans in our sample had experienced the suicide of a friend and 7% had experienced the suicide of a relative. This disparity is more pronounced than that found in the recent meta-analysis of population-based studies reporting the prevalence of bereavement by the suicide of a friend (14.5%) compared with a relative (3.9%) (Andriessen et al., 2017). (Andriessen et al., 2017) This could be partly explained by elevated suicide rates in younger UK veterans (Rodway et al., 2023) and the wide social networks gained through the nature of military training and deployment. Previous research shows that the focus of most formal and informal suicide bereavement support tends to be on close family members, with others in the social network feeling relatively neglected (Pitman et al., 2018a, 2014). This suggests potential for the needs of veterans bereaved by a friend's suicide to be overlooked, particularly where the deceased had also served in the armed forces, creating the potential for strong identification with the deceased (Pitman et al., 2017a).

Our estimate for the period prevalence of loneliness (57%) in a clinical sample was lower than the point prevalence estimate of 79% gained in a 2020 survey of veterans seeking treatment from a UK veterans mental health charity, asked directly about this using the validated 3-item UCLA Loneliness Scale (Williamson et al., 2022). This may be explained by our method of capturing loneliness by relying on the issue being raised by either patient or clinician and documented. In comparison to community samples of veterans, our estimate was similar to that of 56% for UK veterans in a 2018 sample directly questioned about feeling lonely (Stapleton, 2018). In that Royal British Legion survey 25% reported feeling lonely 'Always' or 'Often', and 31% reported feeling lonely 'Sometimes' (Stapleton, 2018). However, it is lower than the point prevalence estimate of 27% in a 2020 community sample of veterans during the COVID-19 pandemic (Sharp et al., 2021), perhaps because that survey used direct inquiry with the 3-item UCLA Loneliness Scale. It is possible that our approach under-ascertained the prevalence of loneliness in a clinical sample.

Strengths and limitations

Our study captured all referrals to a defined mental health service for London-based UK veterans, excluding only those who did not engage. The advantage of using routine electronic health records over paper records was the relative ease of searching for specific terms using computational approaches. Coding was conducted by clinically qualified researchers with a high degree of familiarity with the linguistic style of data. Our use of search terms augmented by careful reading of the free-text context by clinically-trained veteran-sensitive researchers suggests that these methods might have, in machine learning terms, greater precision (the proportion of the total identified that are true positives) and sensitivity (the proportion of true positives that exist in the database that are identified, sometimes described as 'recall') compared with

machine learning approaches such as Natural Language Processing (NLP) applications. These are commonly used when analysing electronic health records, but may have poor precision and sensitivity when identifying events (*e.g.* suicide bereavement) or contextual factors (*e.g.* loneliness). We adjusted models for potential confounders agreed *a priori* and interpreted our findings regarding prevalence estimates for suicide bereavement in the context of a rigorous systematic review of the wider literature (Andriessen et al., 2017).

Some of the limitations of this study suggest that we may have over- or under-estimated the prevalence of suicide bereavement, loneliness and/or other key variables in this veteran sample, limiting the generalizability of our findings beyond a high-risk veteran sample. Our sample size was limited by the numbers of patients referred to the service over this short time frame, and we did not conduct a formal power calculation for our hypothesis-testing. It is therefore possible that our analysis was underpowered to test our hypothesis, and it would be important to test this in larger datasets. Our use of routine clinical data for hypothesis-testing meant that we lacked data on other covariates that are likely to confound the association between suicide bereavement and suicide-related outcomes, including pre-bereavement depression, pre-bereavement suicide attempt, pre-bereavement non-suicidal self-harm, and factors that might modify the association, such as years since bereavement and kinship to the deceased. There were missing data on some variables (such as number of suicide losses) but not on any covariates used in regression models. Given the established association between suicide bereavement and adverse mental health outcomes (Pitman et al., 2014), our focus on a clinical sample, and on those veterans in secondary mental healthcare who were deemed to have high levels of clinical need, is likely to over-represent the prevalence of suicide bereavement when compared with veterans in the general population or those in secondary mental healthcare at all levels of need. However, survey evidence from UK veterans suggests that the majority of veterans with perceived mental health problems seek some form of help, with over half using formal medical sources of support (Stevelink et al., 2019). Whilst our approach to coding improved the specificity of our coding due to a familiarity with clinical and veteran terminology, the sensitivity of our approach was limited by whether or not clinicians had asked about and recorded in the electronic notes any information about suicide loss or loneliness. However, increasing awareness amongst mental health professionals of suicide bereavement and loneliness as risk factors for depression and suicide is likely to have primed individuals to record these where present. Finally, findings from a London setting may not be generalizable to other UK regions.

Clinical, policy and research implications

This is the first estimate of the prevalence of suicide bereavement in a veteran sample in the UK and identifies the high prevalence of suicide bereavement (particularly that of a friend), of loneliness, and of substance misuse in this population. Findings suggest a clear need to address their social needs, with support particularly tailored where substance misuse is involved. It was concerning that some veterans had been exposed to up to eight suicide losses, and our broad impression from reviewing the notes was that this sub-group had been exposed to particularly intense deployment trauma and to the suicides of a number of military colleagues. We lacked data on the age of the relative/friend who had died by suicide and lacked complete data on the proportion of those friends who were civilians, but given elevated suicide rates among UK veterans under 25 years (Rodway et al., 2023) and the age structure of our sample, it is possible that exposure to the suicide deaths of fellow veterans accounts for the high prevalence of suicide bereavement in our sample. Experiences of the suicide of a former colleague create the potential for moral injury due to the context for the loss, compounding loneliness. Further qualitative work is required to investigate concepts of moral injury, suicide suggestion effects, and the cognitive availability of suicide methods. As many suicide bereavement support services may be perceived as targeting bereaved relatives, it is possible that veterans bereaved by a friend's suicide are overlooked in their support needs.

Social network analysis in the US suggests that a median of 60 people are "intimately and directly affected" by each suicide death, including nuclear and extended family, friends, colleagues, and classmates (Berman, 2011). Given the training, regimental and deployment features of life in the armed forces, social networks are likely to be wide in this occupational context. The nature of military kinship means that close connections are forged in those settings (Mancini et al., 2018). The influence of perceived closeness to the deceased warrants particular investigation; in a US veteran sample perceived closeness was associated with a higher probability of depression, anxiety, PTSD, and prolonged grief (Cerel et al., 2015). This is also observed in the general population (Cerel et al., 2014; van de Venne et al., 2017), where typically a first degree relative may be emotionally closer than a former colleague. However, the concept of kinship in military communities blurs the distinction between colleagues and siblings (Mancini et al., 2018) and the interplay of kinship and closeness is therefore likely to differ in military *versus* civilian samples. Further work is needed to identify the reach of the social networks of veterans and serving armed forces staff who die by suicide, to gain a sense of the impact on others (whether relatives, friends or colleagues). This would also help identify channels of communication by which peers might be directed to appropriate support. Given the stigma of suicide loss (Hanschmidt et al., 2016) and its influence on the support available to the suicide-bereaved (Pitman et al., 2017b, 2018b) it is important that veterans are encouraged to self-refer for support.

The interventions available to people bereaved by suicide are not well supported by evidence for a reduction in suicide risk, although there is evidence that post-suicide support can improve depression, anxiety and uncomplicated grief (Andriessen et al., 2019). However, new interventions are in development and under evaluation. Recently NHS England have commissioned an evidence-based suicide bereavement resource for relatives, friends and colleagues of UK Armed Forces personnel (serving or ex-serving) who die by suicide, which is being developed at the University of Manchester. This resource will help respond to the needs of the estimated 30% of veterans treated in secondary mental health services who have experienced suicide loss. More generally, it is important that all those who encounter veterans in clinical or occupational settings are aware of the need to screen sensitively for suicide loss and for loneliness, are aware of local suicide bereavement support sources available to them (PHE, 2015).

Trials of interventions to address loneliness in the general population have suggested a role for meditation/mindfulness, social cognitive training, and social support (Veronese et al., 2021), web-based and phone-based digital interventions (Toh et al., 2022), and interventions addressing maladaptive social cognitions (Masi et al., 2011). In clinical populations the most promising interventions appear to involve addressing maladaptive cognitions (Mann et al., 2017). Very few interventions to address loneliness among veterans have been evaluated. One pilot trial of a psychoeducational and cognitive bias modification (CBM) program for veterans, aimed at addressing thwarted belongingness and perceived burdensomeness as a means of reducing suicidality, was found to reduce both thwarted belongingness and perceived burdensomeness but not suicidality relative to controls (Short et al., 2019). A before-and-after study of a group outpatient intervention for veterans to improve depression and hopelessness by improving group connectedness found an improvement in depression and hopelessness but did not compare group connectedness (Vitale et al., 2021). Other social support interventions developed for veterans, including mentorship and peer-to-peer Caring Cards sent to veterans after psychiatric discharge, have evidence of acceptability (Hou et al., 2022). Clearly more work is needed to develop and evaluate veteran-sensitive initiatives to address loneliness.

Given the limitations of our approach to screening veterans' routine clinical records, there is also a clear need to estimate the prevalence of

suicide bereavement and loneliness in a wider clinical sample (both in terms of geographical location and clinical risk) as well as in a non-clinical sample of veterans to improve generalisability. A previous meta-analysis of population-based studies reporting the prevalence of suicide bereavement called for a standardization of measures used to screen for past suicide loss (Andriessen et al., 2017). Clinical consensus is needed on a set of screening questions used routinely in clinical practice to capture bereavement and loneliness, and consider appropriate responses. Public health researchers also need algorithms to apply to electronic health records to identify patients with these specific risk factors for suicide-related outcomes.

Conclusions

We provided the first estimate of the prevalence of suicide bereavement in a UK veteran sample, establishing an estimated lifetime prevalence of 30% in this defined group; greater than that estimated for general population samples. We estimated the period prevalence of loneliness in this sample at 57% but found no association with suicide bereavement. The limitations of our approach using routine clinical records suggest that our findings may not be generalisable to a non-clinical sample, or to all veterans in secondary mental healthcare. However, they do identify a clear need to address veterans' needs for suicide bereavement support, social connectedness interventions, and substance misuse input in mental health settings.

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Data and code availability statement

Data are not available as derived variables risk identifying individuals. SPSS code will be made available via the corresponding author.

Ethics statement

This work did not require specific ethical approval as it was conducted as a needs assessment in the context of a service improvement project.

Informed consent statement

Patient consent was waived as this project was intended as a service improvement project.

CRediT authorship contribution statement

Marta Lages Abrantes: Conceptualization, Methodology, Software, Formal analysis, Data curation, Writing – review & editing, Project administration. **Alexandra Pitman:** Conceptualization, Methodology, Validation, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that have been used are confidential.

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