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Observational study of the pre-service vulnerabilities, in-service exposures and post-service antecedents of suicide in veterans of the UK Armed Forces, 2007–2018

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ABSTRACT

Introduction Although there have been a number of epidemiological studies of suicide in veterans, there have been few in-depth studies of those who have died. Studies have not explored the relative contribution of pre-service, in-service and post-service factors. We aimed to investigate the adversities veterans face before they take their lives, their contact with support services that could be preventative and whether these differ in younger and older veterans.

Methods Using national databases of discharged personnel and suicide deaths, we identified deaths by suicide in personnel who left the UK Armed Forces (UKAF) between 2007 and 2018. We extracted information on the antecedents of suicide in a random sample of these deaths from official investigations, mostly coroners' records.

Results In total, we obtained data for 145 individuals; 134 (92%) were male and 11 (8%) were female. Seven (5%) were from a minority ethnic group. The median age at death was 36 years (21–65 years). 18 (12%) veterans had experienced childhood adversity. Relatively few (10, 7%) experienced trauma relating to deployment on combat operations or had difficulty adjusting to civilian life (6, 4%). Most (140, 97%) veterans had been in contact with support services, particularly primary care (130, 90%), but undertreatment was common with only 10 (5%) veterans having received psychological intervention. Unemployment, alcohol and drug misuse, mental and physical ill health, workplace, housing and relationship problems were common antecedents.

Conclusions Veterans experience a range of challenges after leaving the UKAF. Common antecedents to suicide, such as self-harm, suicidal ideation and drug misuse, are open to intervention. However, despite most veterans seeking help from a range of support services, few were receiving psychological intervention. Prevention should also focus on addressing the needs of veterans beyond mental ill health, like employment and housing.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Research examining suicide risk in veterans is conflicting, although there is some evidence for differences according to age, with higher risk in younger veterans. Factors reported in the research literature as increasing the risk of suicide in veterans include early discharge, having a short length of military service, being untrained on discharge, being unemployed, having problems with alcohol and mental ill health, particularly depression.

WHAT THIS STUDY ADDS

⇒ Our findings highlight that the recent and most common risk factors for suicide experienced by veterans of the UK Armed Forces mirror those reported in the general population (eg, unemployment, mental and physical ill health, bereavement, alcohol and drug misuse, and self-harm).

⇒ Contrary to previous research, contact with support services, particularly primary care, was common and often occurred shortly before death. However, only a small number of veterans were receiving treatment, particularly in the form of psychological intervention, despite the most common factors prior to suicide (such as self-harm and drug misuse) being open to intervention.

INTRODUCTION

There are approximately 2 million UK Armed Forces veterans in England and Wales[1] and many times this number worldwide. The impact of military service, the mental health of veterans and the issue of suicide in particular are areas of public and political concern.[1] However, research examining suicide among veterans is conflicting. Studies in the USA, Canada and Australia show that veterans have higher rates of

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Despite the higher-than-expected rate of contact with support services in our sample, only a minority of veterans had been receiving treatment, particularly psychological intervention. The possible barriers to treatment need to be better understood. Lack of awareness among the veteran community and practitioners regarding specific support services that are available for veterans is one possibility.

⇒ To honour the Armed Forces Covenant, a promise made by the nation to treat those who serve and have served fairly, we should consider whether the current provision is meeting the needs of veterans. Particularly, the appropriateness of providing generic mental health support versus support targeted at specific needs, such as drug misuse, or ensuring veterans are able to access support services staffed by people who understand Armed Forces culture.

suicide compared with their respective general populations.[2–6] By contrast, in the UK, Denmark and Sweden, studies have found no overall increase in suicide risk among veterans.[7–11] Furthermore, studies suggest that the risk of suicide is lower among veterans aged 35 years and older than in the same age groups in the general population, highlighting that not all veterans are at equal risk.[11] Factors associated with a reduced risk of suicide in veterans of the UK Armed Forces (UKAF) include being married, a higher rank on discharge and deployment on combat operations.[3 11 12] Factors reported as increasing risk include being discharged between the ages of 16 and 34 years, having depression or alcohol problems, serving for less than 10 years and being untrained on discharge.[7 8 11 13–16] Although informative, existing research examining suicide among veterans has largely relied on administrative or health databases, limiting the depth of information collected.[7 8 11]

There is a paucity of research into how pre-service vulnerabilities (eg, adverse childhood events), lifestyle factors (eg, alcohol and drug misuse) and social adversities after discharge from the Armed Forces (eg, relationship breakdown, financial problems and unemployment) influence later suicide risk in veterans.[7 8 11] Similarly, the impact of in-service factors, such as deployment and combat experience, after discharge requires further exploration.[2 6] Mental disorder, alcohol and drug misuse may be more common in veterans than in the general population.[17–19] Despite this, some studies suggest that they do not seek treatment[20–22] due to perceived stigma, a sense of stoicism instilled by military culture and difficulties in accessing mental health services.[23] The transition to civilian life also introduces new challenges in relation to social isolation, including the loss of close friendships formed during military service, difficulties in establishing roots due to previous frequent geographical mobility and other health and psychosocial factors known to be associated with suicide risk (eg, older age, symptoms of depression or post-traumatic stress disorder (PTSD)).[24 25]

We established a study of suicide in veterans to understand the adversities they faced prior to death. In this article, we present findings from official data sources for a sample of individuals who died by suicide after leaving the UKAF. Using these data, we aimed to: (1) describe the pre-service vulnerabilities, in-service exposures and post-service factors they experienced; (2) explore the role of social characteristics, such as living circumstances, employment and recent life events prior to suicide; (3) describe clinical factors related to suicide in veterans and (4) examine help seeking and contact with support services or agencies. We also wished to explore differences in these antecedents between veterans who were discharged from the UKAF between the age of 16–24 years and those discharged at the age of 25 years or above, as previous literature highlights an increased risk in younger veterans.[7 11]

MATERIALS AND METHODS

Sample

In this study, we examined deaths by suicide in veterans of the UKAF who died in England, Scotland and Wales between 1 January 2007 and 31 December 2018. Data from Northern Ireland were not obtained due to restrictions on sharing identifiable data.[26] In this 12-year period, we identified 1230 (approximately, 0.2% of all veterans who left the UKAF in this time period) veterans who died by suicide by linking databases on all individuals who left the UKAF (collected by the Ministry of Defence (MoD)) with people who died by suicide in the general population (collected by the National Confidential Inquiry into Suicide and Safety in Mental Health (NCISH)). Individuals who had left any of the three branches of the UKAF (Royal Navy (including Royal Marines), Army and Royal Air Force (RAF)) were included and, in accordance with the UK definition of a veteran, we included anyone who left after their first day of basic training as either a Regular or a Reservist.[27] Details of this linkage have been published previously.[11] As is conventional for suicide research,[28] deaths that were assigned the International Classification of Diseases, Tenth Revision (ICD-10) codes X60–X84 (intentional self-harm) or ICD-10 codes Y10–Y34 (excluding Y33.9) and Y87.0 and Y87.2 (events of undetermined intent) were included. These deaths are collectively referred to as suicides throughout this article.

We aimed to investigate the antecedents of suicide in a random sample of 200–250 (up to 20%) of these 1230 deaths. This was an approximate sample size based on our previous experience of the amount of data it would be practical for researchers to obtain and extract within the study timescale.[29 30] All suicide deaths by female veterans in the study period (2007–2018) were included due to low numbers (n=11). For male veterans, sampling was stratified by (1) 5-year age groups (eg, under 25 and 25–29 years) and (2) each country. A total of 266 veterans were sampled: 213 from England, 35 from Scotland and 18 from Wales (22% of all suicide deaths in the study period); this oversampling was to allow for attrition.

Data sources

We collected data from coroners' inquests in England and Wales and police sudden death reports in Scotland. For deaths in England and Wales (n=231), audio recordings of inquest proceedings, or statements and depositions submitted as evidence during the inquest, were requested from the senior coroner of the jurisdiction where the death occurred. For deaths in Scotland (n=35), redacted police sudden death reports were requested from the Crown Office and Procurator Fiscal Service. In total, we obtained data for 145 of the 266 (55%) suicide deaths by veterans that were sampled (12% of all suicide deaths in veterans in the 12-year study period). For the remaining cases (n=121), the most common reasons for data not being provided were coronial office resource issues, such as staff, being unable to locate files from historical archives (n=77) or no response being received from the coroner (n=34). Data collection may have been impacted by pressures on coronial offices following the COVID-19 pandemic (ie, a backlog of death registrations) resulting in insufficient resources to respond to additional requests, such as those of our study. To ensure the robustness of data extraction, two researchers (CR and JW) independently coded data from a sample of 21 (15%) coroner inquest hearings. Initial agreement across variables ranged from 75% to 100%. Any uncertainties were discussed, and a consensus decision was reached.

Procedure

Information on antecedents of suicide was extracted from the data sources using a structured proforma. This was based on the data collection tool for previous studies,[29 30] but additional specific variables were informed by the research literature on suicide in veterans of the UKAF. The study team also sought advice from members of National Health Service (NHS) England's Armed Forces Patient and Public Voice Group, the Centre for Mental Health and Safety's dedicated Patient and Public Involvement and Engagement (PPIE) group and from a veteran of the UKAF. Variables included demographic information and family history, in-service experience (eg, deployment), physical and mental health history, treatment, use of alcohol and drugs, contact with support services, life events, including workplace, relationship and financial problems, and any history of bereavement. Antecedents were recorded if they were referred to in the data sources as having been present pre-service, during military service, after discharge from the UKAF (post-service) and within the 3 months prior to death (referred to as 'recent'). Information not recorded in the data sources was assumed to be absent or not relevant to the veteran's death.

Statistical analysis

Descriptive statistics using frequencies, percentages and 95% Poisson confidence intervals (CIs) are presented for all estimates. The denominator for all estimates was the total number of veterans on whom we received data (ie, 145), unless, otherwise, stated. Pearson's χ^2 tests were used to determine the association between subgroups (eg, veterans with a history of self-harm compared with veterans without a history of self-harm). We also determined associations between younger veterans (those discharged from the UKAF between the ages of 16–24 years) and older veterans (those discharged from the UKAF at age 25 and above) on key sociodemographic and clinical characteristics. The magnitude of these associations was measured using logistic regression analysis (two separate models) with outcomes being (1) younger versus older veterans or (2) no history versus history of self-harm, and the exposure variables being the absence or presence of other characteristics, for example, a diagnosis of mental illness. Unadjusted differences are presented using odds ratios (ORs) and 95% CIs. To account for multiple testing, we applied the Bonferroni correction method[31] when reporting statistical significance. This was at the 0.6% level ($p<0.006$) to account for the nine multiple factors that were examined.

When reporting results, counts under five (including zero) are not reported in accordance with statistical disclosure control to protect confidentiality and are referred to as 'rare' in this article. Analyses were undertaken using Stata software v16.1 and the Statistical Package for Social Sciences (SPSS) V.25.

Patient and public involvement

Three members of the Mutual Support for Mental Health Research (the patient and public involvement and engagement group at the Centre for Mental Health and Safety, University of Manchester), a group of people with experience of self-harm, suicidality or mental illness as either patients or carers and three members of the Armed Forces Community were involved in the research process by providing advice during the design of the study, in particular advice on data items for inclusion on the data collection proforma.

Role of the funding source

This study was funded by the MoD and NHS England (NHSE). The MoD provided data on all service personnel who left the UKAF that was linked to NCISH data to identify veterans who died by suicide during the study period. Coauthors from the MoD (KH and HD) and NHSE (AB) assisted in interpreting the study findings.

Funding statement

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Data availability statement

Data from this study are not available due to the sensitive nature of the research and the information governance restrictions in place to protect confidentiality.

RESULTS

We extracted information from official investigations on 145 veterans who died by suicide between 2007 and 2018. This represented 55% of the total sampled (n=266) and 12% of all veterans who died by suicide in this period (n=1230). The characteristics of the veterans for whom we obtained information were similar to those for whom information was not obtained (n=121) in terms of age at death and discharge, gender, service type (regular or reserve), service branch (Royal Navy, Army and RAF), length of military service, method of suicide and time from discharge to death (online supplemental table 1).

Of the 145 veterans, 134 were men (92%) and 11 (8%) were women. Due to the small number of female veterans, we were unable to carry out any stand-alone analyses for this group. The median age at death was 36 years (range: 21–65 years). Information on ethnicity was available for 98 (68%) of the 145 veterans we examined; 7 (5%) were recorded as being from a minority ethnic group. For 89 (61%) individuals', veteran status was identified in the inquests or police reports. The most common method of suicide was hanging/strangulation (105, 72%), followed by self-poisoning (14, 10%) and inhalation of gases (6, 4%). Other methods (20, 14%), including firearm deaths, were rare.

Pre-service factors, in-service factors and adjustment to civilian life

Data sources indicated that 18 (12%) veterans had experienced at least one adverse childhood experience (ACE), including physical, emotional or sexual abuse, parental mental illness or criminality, witnessing domestic violence or being a child in care. Eight veterans (6%) had two or more ACEs.

107 (74%) veterans had served as regulars in the UKAF; 34 (23%) as reservists. The serving status of four veterans was unknown. Most (119, 82%) had served in the Army, 14 (10%) in the Naval Services (Navy or Marines) and 12 (8%) in the RAF.

Deployment on combat operations was recorded for 29 (20%) veterans, mainly to Northern Ireland (12, 8%), Iraq (10, 7%) and Afghanistan (9, 6%). Traumatic experiences relating to deployment on combat operations were recorded for ten (7%) veterans and included witnessing the death of or being instructed to identify and retrieve the bodies of colleagues or civilians.

For six (4%) veterans, evidence presented during the inquest referred to them struggling to adapt to civilian life. For example, they 'had trouble adjusting following active duty' or 'struggled to settle after leaving the Army'.

Table 1 Demographic, social and clinical antecedents of veterans who died by suicide

	Total (n=145)		
Antecedent	**N**	**%**	**95% CI**
Sociodemographic characteristics			
Single	69	48	37 to 60
Living alone	60	41	31 to 53
Socially isolated	20	14	8 to 21
Unemployed	43	30	21 to 40
Experience of bereavement			
Bereaved (at any time)	34	23	16 to 33
Bereaved (since discharge from UKAF)	24	17	10 to 25
Bereaved by suicide (at any time)	6	4	2 to 9
Medical history			
Physical health condition	48	33	24 to 44
Any diagnosis of mental illness	90	62	50 to 76
Affective disorders*	52	36	27 to 47
Personality disorder†	10	7	3 to 13
Anxiety-related disorders‡	9	6	3 to 12
Evidence of PTSD§	14	10	5 to 16
Alcohol misuse	62	43	33 to 55
Drug misuse	47	32	24 to 43
Self-harm and suicidal ideas			
Previous self-harm	66	46	35 to 58
Overdose	19	13	8 to 20
Cutting	20	14	8 to 21
Recent self-harm that required medical treatment	13	9	5 to 15
Suicidal ideas and/or intent	70	48	38 to 61

*A primary diagnosis of bipolar disorder or depression.
†Includes a primary diagnosis of antisocial personality disorder and emotionally unstable personality disorder.
‡Includes a primary diagnosis of generalised anxiety disorder, panic disorder and obsessive compulsive disorder.
§Includes a primary, secondary or tertiary diagnosis of PTSD.
PTSD, post-traumatic stress disorder; UKAF, UK Armed Force.

Social factors

Sociodemographic characteristics

Table 1 shows the demographic, social and clinical antecedents of suicide in veterans of the UKAF. Most (48%) were single, 56 (39%) were married, cohabiting or in a relationship, and 15 (10%) were divorced, separated or widowed. Most (41%) lived alone, 43 (30%) with a spouse or partner and 34 (23%) with a parent(s) or in another shared arrangement. Homelessness was rare

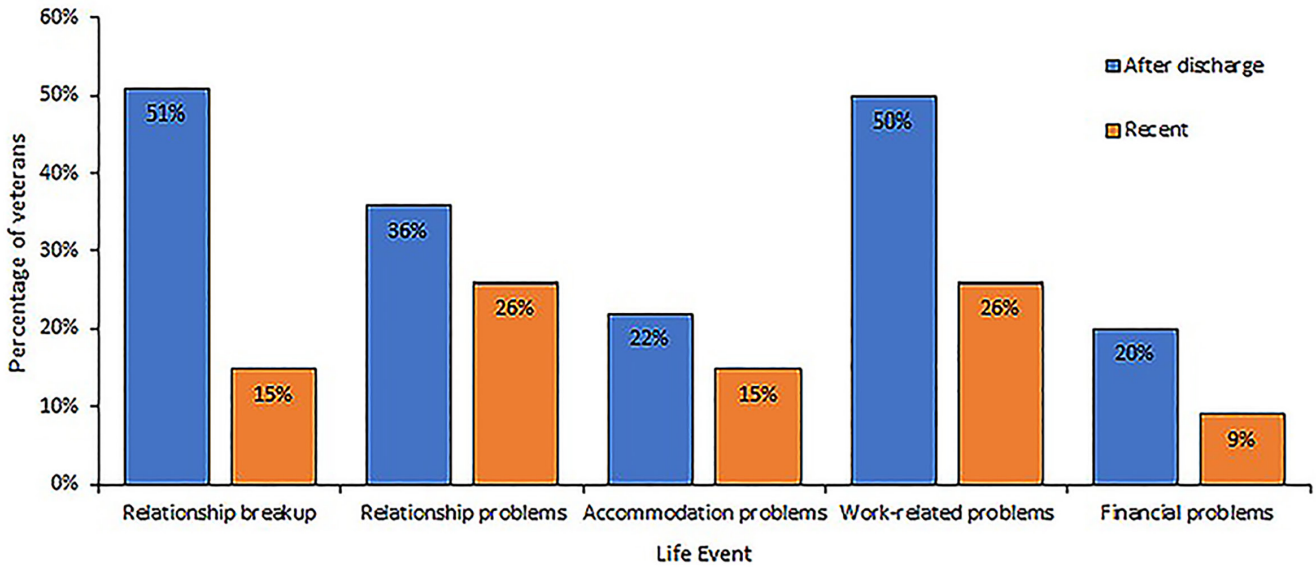

Figure 1 Life events experienced by veterans after discharge from the UKAF and within 3 months of death ('recent').

(n<5). In 14% of veterans, there was evidence of social isolation, such as having no contact with friends or family. Overall, 30% of veterans were unemployed at the time of death, 9 (6%) of whom had been unemployed for more than 12 months. Five (3%) veterans were on long-term sick leave. 34 (23%) veterans were reported to have experienced bereavement at some point during their lifetime; 23 (16%) had been bereaved following discharge from the UKAF and 5 (3%) in the 3 months prior to their death. Six (4%) had been bereaved by suicide.

Life events

The most common life events experienced by veterans (1) after leaving the UKAF and (2) within the 3 months prior to death ('recent') are shown in figure 1. These were focused on relationships, the workplace, housing and finance.

52 (36%) veterans were reported to have experienced relationship problems following discharge from the UKAF, such as arguments with a partner. 72 (50%) reported workplace problems after discharge, including job loss (34, 23%), job insecurity (14, 10%), a change of job (13, 9%) or other problems, such as being on sick leave or receiving a disciplinary notice/suspension (26, 18%). In the 3 months prior to death, seven (5%) veterans reported workplace stress and six (4%) reported mental ill health or alcohol and/or drug misuse causing absence from work.

Accommodation problems, which were reported for 32 (22%) veterans, related to housing instability, such as 'sofa surfing', temporarily staying with family and/or friends or being asked to leave the family home. Financial problems included debt (27, 19%) and concerns about money owed (eg, credit, loans or mortgage repayments; 17, 12%).

Clinical factors

Physical health

48 (33%) veterans had a physical health condition, most commonly musculoskeletal problems (n=14, 9%) affecting mobility. We do not have information on whether these problems were caused by injuries sustained during military service. 12 (8%) veterans had a circulatory/cardiovascular condition, and 10 (5%) veterans had a disease relating to the digestive or endocrine system. For 39 (27%) veterans, the condition was chronic, lasting more than 12 months. 12 (8%) veterans had multiple health conditions. 35 (24%) had a comorbid physical and psychiatric diagnosis, most often depressive illness (17, 12%).

Mental ill health

A diagnosis of mental illness was reported for 90 (62%) veterans. The most common primary diagnosis was affective disorder (bipolar disorder or depression), followed by personality disorder and anxiety-related disorders (table 1). There was evidence of a PTSD diagnosis in 14 (10%) veterans. 41 (28%; 46% of veterans with a primary diagnosis) veterans had a secondary diagnosis, mainly depressive illness (18, 12%).

Alcohol and drug misuse

A history of alcohol misuse following discharge from the UKAF was reported in 62 (43%) veterans; drug misuse in 47 (32%). 41 (28%) veterans were reported to have recently misused alcohol and 32 (22%) drugs. The most commonly misused drugs were stimulants (eg, amphetamines and cocaine (28, 19%)), cannabis (14, 10%) and heroin or other opiates (6, 4%). 23 (16%) veterans had a history of alcohol and drug misuse.

Self-harm and suicidal ideas

66 (46%) veterans had a history of self-harm; 26 (18%) had recent self-harm. Veterans who self-harmed were more likely than veterans with no history of self-harm to have misused alcohol (40, 61% vs 22, 28%, OR=3.99, 95% CI 1.99 to 8.00, p<0.001) or drugs (32, 49% vs 15, 19%, OR=4.02, 95% CI 1.91 to 8.43, p<0.001), experienced suicidal ideation (43, 65% vs 27, 39%, OR=3.60, 95% CI 1.81 to 7.16, p<0.001) and have a diagnosis of mental illness (51, 77% vs 39, 49%, OR=3.49, 95% CI 1.69 to 7.20, p=0.001).

70 (48%) veterans had expressed suicidal ideation or intent since leaving the UKAF. These thoughts were most often expressed to a health professional (39, 27%), partner (24, 17%) or family member (19, 13%). Recent expressions of ideation or intent were reported by 40 (28%) veterans; 19 (13%) in the week prior to death.

Help seeking and treatment

Contact with support services

140 (97%) veterans had been in contact with at least one support service or agency since leaving the UKAF (table 2). This was most often with their general practitioner (GP) (90%), followed by mental health services (48%), the emergency department (37%) and justice system agencies (22%). 13 (9%) veterans were seen by NHS drug and alcohol services and 7 (5%) by third sector/voluntary drug and alcohol services. Eight (6%) veterans had seen third sector veteran-specific organisations, such as Combat Stress. Seven (5%) had contact with social services.

Contact with support services within 3 months of death ('recent') was reported for 54% of veterans, most often with a GP (table 2). Of the 51 (35%) veterans who had recently seen their GP, 15 (10%) were seen in the week before death. At their last GP contact, 29 (21%) veterans had consulted regarding their mental health and 16 (12%) for physical illness. In 40 (28%) cases, the GP was aware that the individual was a veteran. Of the 20 veterans in recent contact with justice system agencies, 8 (6%) were in contact the week before death. 16 (11%) had been in contact with the police for interviewing or fixed penalty notices. 11 (8%) veterans had served time in prison following discharge from the UKAF or were in prison at the time of their death. 64 (44%) veterans had some form of contact with support services since leaving the UKAF but had not been in recent (3 months) contact.

Treatment

44 (30%) veterans were prescribed antidepressants at the time of death (typically selective serotonin reuptake inhibitors/serotonin-norepinephrine reuptake inhibitors) (28, 19%) but also other antidepressants (12, 8%)). Ten (5%) were receiving psychological treatment (eg, cognitive behavioural therapy). 15 (10%) veterans were documented as having problems accessing NHS-based mental health support, for reasons, including a delay in receiving treatment, remaining on a waiting list or issues with the referral process. Overall, 60 veterans (41% and 67% of those with a diagnosis of mental illness) were receiving treatment in the form of either medical and/or psychological therapy.

Table 2 Contact with support services and treatment in veterans who died by suicide following discharge from the UKAF and within 3 months of death ('recent')

	Total (n=145)		
	N	%	95% CI
Contact with support services at any time after discharge			
Any service contact	140	97	81 to 114
GP	130	90	75 to 106
Emergency department	53	37	27 to 48
Mental health services	70	48	38 to 61
Justice system/ police	33	22	16 to 32
Recent contact with support services			
Any service contact	79	54	41 to 66
GP	51	35	26 to 46
Emergency department	17	9	5 to 15
Mental health services	30	19	13 to 28
Justice system/ police	20	14	8 to 21
Treatment*			
Medical and/ or psychological therapy	60	41	23 to 53
Prescribed antidepressants	44	30	22 to 41
Psychological therapy	10	5	3 to 13

*Since discharge from the UKAF.
GP, General Practitioner; UKAF, UK Armed Forces.

Comparison of younger (aged 16–24 years on discharge) and older (aged 25 years and over on discharge) veterans

66 (52%) of the 145 veterans we examined who died by suicide were aged 16–24 years on discharge from the UKAF and 69 (48%) were aged over 25 years. Younger veterans who died by suicide were more likely than older veterans to be single (45, 59% vs 24, 35%, OR=2.72, 95% CI 1.37 to 5.34, p=0.004), have a history of suicidal ideation or intent (45, 59% vs 25, 36%, OR=2.55, 95% CI 1.31 to 5.00, p=0.006) and drug misuse (35, 46% vs 12, 17%, OR=4.05, 95% CI 1.88 to 8.75, p=0.001). There were no differences in support service contact between younger and older veterans.

DISCUSSION

Main findings

We have studied the characteristics of and stresses facing veterans who have died by suicide, characteristics which few previous studies have been able to examine in detail. While simple descriptive studies cannot unpick causal relationships or mechanisms, they can be helpful in informing the focus of preventive efforts.

In our study, more than one in ten veterans who died by suicide had experienced childhood adversity. With respect to in-service and post-service experience, 7% of veterans had experienced traumatic combat-related events and 4% had difficulty adjusting to civilian life. Many of the characteristics we found in our sample of veterans were consistent with established risk factors for suicide. Veterans who died were commonly single, unemployed and almost a quarter had been bereaved. Workplace, relationship and housing problems were common life events, sometimes occurring shortly before death. Alcohol and drug misuse and self-harm were also common. Almost half of the veterans whose data we examined had a history of suicidal ideation, which had often been disclosed to support services or family members. Around 60% of veterans who died by suicide had a diagnosis of mental illness, but rates of PTSD were low—consistent with previous research.[32] A third of the veterans had a physical health problem; a quarter had both a physical and mental health problem. Fewer than half of veterans with a psychiatric diagnosis had been receiving treatment, with only 1 in 20 veterans having received psychological intervention. Contact with support services, particularly primary care, was common and often occurred shortly before death. Young veterans who left the UKAF before 25 years of age were more likely than older veterans to be single, have a history of suicidal ideation or intent and drug misuse.

Interpretation and implications

This study demonstrates that suicide in veterans of the UKAF is complex and includes a combination of military service-related, social and clinical factors, the latter of which are commonly reported in the general population.[30] Our findings highlight a number of modifiable risk factors, especially in younger veterans aged under 25 years—the group whose suicide risk we have found to be 2–3 times higher than in the same age group in the general population.[11] Many of these factors have a strong association with suicide in the general population, such as economic stress (ie, unemployment and financial problems), substance misuse, mental illness and self-harm and suicidal ideation/intent, suggesting that prevention should focus on a general reduction in population risk with specific interventions for veterans at high risk, such as those with severe mental illness, substance misuse or self-harm. Few veterans reported difficulties in adjusting to civilian life or traumatic events, while in-service, perhaps indicating that the challenges of daily living, had a greater impact. In our veteran cohort, the median time between discharge and death was 10 years (with some deaths occurring more than 20 years after leaving military service), highlighting the need for a long-term approach to suicide prevention in this group.

This study used a case series design and we did not have a control group. We are, therefore, aware that an important question is how common these antecedents are in the general population? An earlier study of suicide in men aged 40–54 years ('middle aged') using identical methodology[30] can provide some useful context. Middle-aged men who die by suicide, although slightly older than our veteran cohort (median age 36 years), had similar social (eg, unemployment) and clinical characteristics (eg, mental health diagnoses, self-harm, alcohol and drug misuse), recent life adversity (eg, accommodation and workplace problems) and contact with support services. The similarities between suicide in veterans and the general population have also been discussed in previous research.[7 33]

Previous research reports a low rate of contact with NHS mental health services in the 12 months prior to death by suicide in veterans of the UKAF,[11] suggesting that they may not be seeking help. However, in this study, nearly half had contact with NHS mental health services at some time after discharge. Despite this, only a minority of veterans had been receiving treatment, particularly psychological intervention, suggesting that the treatment rather than contact might be a more pertinent issue. Improving access to psychological therapy is cited by clinicians as a factor that may have made suicide less likely in patients treated in the general population.[34] The rate of contact with drug and alcohol services was also low (9%), especially given the proportion of veterans reported to have drug (32%) and alcohol (43%) problems. Veterans with mental ill health may also have sought help from support services but were turned away due to coexisting drug and/or alcohol use, further exacerbating their risk. Standards for veterans' mental health services are clear that veterans should not be excluded from treatment based solely on comorbid alcohol or drug problems.[35] The Armed Forces Covenant[27] seeks to influence service delivery across a range of sectors, including healthcare, and our findings suggest that preventative efforts should consider whether the interventions offered by mental health services meet the needs of veterans or if bespoke support is required. Veterans should also be able to access support from health professionals who understand military culture,[27] which has been shown to help them feel understood, resulting in positive engagement.[36]

Over half of veterans had been seen by some form of support service or agency in the 3 months prior to death, particularly by their GP (35%). This presents a further opportunity for prevention through signposting to the sources of mental health or social support and support services helping with employment and housing. Although we recognise that mental health is often managed in primary care without the need for onward referral, we also need to explore the barriers for veterans who are

in contact with primary care but do not receive further treatment, if needed, from secondary care services. For example, are veterans and their GPs aware of the support services available to them? Does their perceived appropriateness prevent veterans from seeking treatment or are there process-related issues that act as barriers to continued engagement? Previous research suggests veterans who leave the UKAF delay help seeking[23 37] because they do not know what support is available or where to seek it.[38] This is despite the UKAF third sector comprising over 1800 registered charities in England and Wales.[39] Promoting and increasing awareness of existing veteran-specific support services, such as Op COURAGE, as is outlined in the Covenant, may benefit veterans who require support but do not know where to look. However, the more pertinent measure may be coordination and collaboration between support services and agencies in a community that may be at risk of being flooded with support.[38] Clinical interventions might be even more important for younger veterans considering that our study found them more likely than older veterans to have previous suicidal ideation and drug misuse, factors that may be amenable to intervention.

Strengths and limitations

Our findings came mainly from coroners, who take evidence from the personal narrative of family, friends and professionals in contact with the individual before they died. This evidence is discussed at inquest because the coroner feels it to be relevant to the person's death. This methodology, used in previous NCISH studies,[29 30] has allowed us to describe the adversities veterans were facing prior to death but is not without limitations. First, the return rate for coroner inquests was lower than anticipated (55% compared with over 80% in previous studies)[29 30] due to the ongoing impact of the COVID-19 pandemic and its aftermath on coroner resources, challenges in retrieving files from historical archives, and coroner staffing. However, the characteristics (eg, age at death/discharge, gender, service type, branch and length of military service) of veterans for whom we were unable to obtain information were broadly similar to veterans whose data we did obtain. Second, when information on a particular antecedent was not reported, it was assumed to be absent, likely leading to the underestimation of some (particularly sensitive) antecedents. Conversely, some figures may be overestimated, as families and others 'search for meaning' following the death of a loved one and emphasise factors they perceive to be most relevant. Furthermore, for 56 (39%) individuals, their veteran status was not identified during the coroner inquest and the coroner may not have known of their military service history, potentially resulting in the underreporting of military service-related factors. We also acknowledge that while we identified and reviewed a wide range of antecedents, this may not be comprehensive. If an adverse experience (ie, work problem) was unknown to the coroner, it would not have been recorded during the inquest and, therefore, not identified in this study. Third, information may be subject to recall bias and variations in completeness or content detail. Fourth, this was not a risk factor study. The design does not allow us to compare veterans who died with those who did not die, as there is no easy source of detailed data on equivalent controls or on an equivalent comparison group. Our findings cannot, therefore, establish causal relationships. Fifth, the findings are aggregated by gender and may be driven by the larger number of deaths in male veterans. Due to small numbers, we were unable to explore if any antecedents were more relevant to female veterans who died by suicide. Finally, due to a lack of available data in Northern Ireland, we acknowledge that our findings may not be a representative of UKAF veterans in Northern Ireland. Figures are also aggregated for England, Scotland and Wales and may be driven by the larger number of deaths in England.

CONCLUSION

Overall, these findings highlight that veterans who died by suicide commonly experienced a range of adversities and stresses after leaving the UKAF, such as alcohol and drug misuse, self-harm and workplace, relationship and housing problems. These factors are potentially amenable to intervention. Although most veterans had sought help from a range of support services, undertreatment appeared to be common with few receiving psychological intervention, for example. Addressing common risk factors for suicide is a priority for suicide prevention in the general population[40] and should equally be so for veterans through the Armed Forces Covenant—society's commitment to treat veterans fairly and to enable equality of outcome with other citizens.[27] Additional focus is needed to consider how best to deliver support to veterans in practice, in an environment where they feel safe and understood, through services that are best able to engage and support them, as well as considering the range of needs that should be addressed in conjunction with mental ill health, including substance misuse, employment and housing.

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Competing interests NK works with National Health Service (NHS) England (NHSE) on national quality-improvement initiatives for suicide and self-harm; is on the Department of Health and Social Care (DHSC) National Suicide Prevention Strategy Advisory Group for England; chaired the guideline development group for the 2012 UK National Institute for Health and Clinical Excellence (NICE) guidelines on the longer term management of self-harm; chaired the guideline development group for the 2022 NICE guideline on depression in adults; and was a topic advisor for the 2022 NICE guideline self-harm: assessment, management and preventing recurrence. LA is the Chair of the DHSC National Suicide Prevention Strategy Advisory Group. NK, LA and PT report grants from the Healthcare Quality Improvement Partnership, NHS England, the Department for Education and the Medical Research Council. PT reports a grant from Gambling Research Exchange Ontario. KH, HD and AB were employees of the Ministry of Defence and NHSE at the time of the study. All other authors declare no competing interests.

Patient and public involvement Patients and/or the public were involved in the design, or conduct, or reporting, or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants. Approvals were received from the Chief Investigators Institution (University of Manchester) Research Governance Office; the Health Research Authority Confidential Advisory Group (21/CAG/0050) who provided exemption under Section 251 of the NHS Act 2006 on 17 June 2021, enabling access to confidential and identifiable information without informed consent; and Public Benefit and Privacy Panel for Health and Social Care (2021-0290) approval was received on 31 January 2022. The MoD Research Ethics Committee provided support for the study on 27 October 2021. Approvals were obtained from all local ethics committees. Participants in this study had tragically died by suicide and, therefore, it was not possible to obtain informed consent.

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