



OPEN ACCESS

Prevalence and risk factors of suicide and suicidal ideation in veterans who served in the British Armed Forces: a systematic review

Rebecca Randles , H Burroughs, N Green, A Finnegan 

Westminster Centre for Research in Veterans, Faculty of Health and Social Care, University of Chester, Chester, UK

Correspondence to

Professor A Finnegan, University of Chester, Chester, CH1 4BJ, UK; a.finnegan@chester.ac.uk

Received 22 March 2023
Accepted 8 May 2023

ABSTRACT

Introduction Research into the factors resulting in suicide in the military veteran population has yet to reach a consensus. Available research is concentrated on a small number of countries, and there is a lack of consistency with contradictory conclusions. The USA has produced a significant amount of research in a country where suicide is identified as a national health crisis, but in the UK, there is little research regarding veterans from the British Armed Forces.

Methods This systematic review was conducted according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. Corresponding literature searches were conducted in PsychINFO, MEDLINE and CINAHL. Articles that discussed suicide, suicidal ideation, prevalence or risk factors among British Armed Forces veterans were eligible for review. A total of 10 articles met the inclusion criteria and were analysed.

Results Veterans' suicide rates were found to be comparable to those of the general UK population. The method of suicide used was most commonly found to be hanging and strangulation. Firearms was recorded in 2% of suicide cases. Demographic risk factors were often contradictory with some research stating that there was risk in older veterans and some in younger. However, female veterans were found to be at higher risk than female civilians. Those who had deployed on combat operations were at lower risk of suicide, with research finding that veterans who took longer to seek help for mental health (MH) difficulties reported more suicidal ideation.

Conclusions Peer-reviewed research publications have revealed that UK veteran suicide prevalence is broadly comparable to the general population while highlighting differences across international armed forces. Veteran demographics, service history, transition and MH have all been identified as potential risk factors of suicide and suicidal ideation. Research has also indicated that female veterans are at higher risk than that of their civilian counterparts due to veterans being predominantly male; this could skew results and requires investigation. Current research is limited and further exploration of suicide prevalence and risk factors in the UK veteran population is required.

INTRODUCTION

The possibility that suicide may be associated with military veteran status is clearly troubling, and there remains no consensus as to whether military service increases the risk of suicide, self-harm or suicidal ideation.^{1,2} The available research is concentrated on a small number of countries and there is a lack

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Despite recent investment into preventing UK veteran suicides, there is a lack of research within a British Armed Forces context.

WHAT THIS STUDY ADDS

- ⇒ There is no significant difference in rates of suicide in the UK veteran community with the civilian population.
- ⇒ Research findings were often contradictory with some stating that older veterans were at higher risk of suicide and others indicating younger veterans. Female veterans were found to be at higher risk than female civilians.
- ⇒ Veterans who took longer to seek help for mental health difficulties reported more suicidal ideation and mood disorders, and they were found to be associated with an increased risk of suicide.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ There are considerable knowledge gaps regarding the prevalence of suicide and suicidal ideation in the UK veteran community. Further research is required to inform policy and provide targeted support for vulnerable individuals during transition to civilian life.
- ⇒ A particularly unexpected finding was that female veterans were found to be at higher risk than that of their civilian counterparts; there has been some recent investment into the female veteran population, though it is clear this requires additional research.

of consistency with contradictory conclusions. However, there is evidence that military veterans present with high levels of mental health (MH) difficulties³⁻⁵ and that they were poor at seeking help, often not pursuing support until they were in crisis.⁶ Factors that are associated with risk of suicide in veterans include being a young male veteran (under 28 years), discharging as an early service leaver (ESL) (within 4 years of enlistment), being an older (over 40 years) female veteran, or having depression or alcohol problems.⁷⁻⁹ The literature also suggests that veterans who experienced adverse life events before enlisting or who have difficulties adjusting to civilian life may be at higher risk.¹⁰

Currently, there is a scarcity of research on suicide prevalence and risk in veterans within a



© Author(s) (or their employer(s)) 2023. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Randles R, Burroughs H, Green N, et al. *BMJ Mil Health* Epub ahead of print: [please include Day Month Year]. doi:10.1136/military-2023-002413

UK context. This extends to learning lessons from the veteran's time within the British Armed Forces, although there are some indicators from active-duty research. These include the identification that the situational stressors of relationship issues, family problems and occupational stressors were the primary significant factors leading to depression in serving personnel,¹¹ or for some young men, the primary stressor is a desire to leave the armed forces, but this is curtailed by their terms and conditions of service¹² and service personnel's self-harming behaviour is correlated with alcohol misuse.¹³

One of the countries with a large body of literature on suicide prevalence, risks and interventions among the veteran population is the USA. Veteran suicide in the USA has been identified as a national health crisis, with an average of 16 veteran suicides per day.¹⁴ In 2020, there were 6146 veteran suicides, a slight decrease from the trend that has seen a year-on-year increase since 2006. The suicide rate for veterans was 57.3% greater than for non-veterans, with 71% using firearms.¹⁴ Canada has a picture similar to the USA, with the risk of suicide for both male and female veterans being consistently higher than that in the Canadian general population.¹⁵ By contrast, Australian male veterans have suicide rates comparable with non-serving men, although the suicide rate is significantly higher in female veterans.¹⁶ Dutch¹⁷ and Swedish¹⁸ veterans have a suicide risk comparable with their respective general populations. Switzerland is somewhat unique in that it has a suicide rate of just below the European average¹⁹ and has the 16th highest gun ownership

in the world.²⁰ Regarding method of suicide, 37% of male suicides in Switzerland use firearms.¹⁹ Within the UK veteran population, one might speculate that suicide by firearms is low due to lower availability and higher restrictions. However, firearms extend to incidents of 'suicide by cop' or law enforcement-assisted suicide,^{21 22} and while rare, when involving UK military veterans they are high-profile events.²³ This suggests that suicide prevalence within the veteran community is dependent on the specific country in which they reside and may be influenced by contextual factors.

There has been a significant investment into suicide prevention in UK veterans with programmes such as the Armed Forces Covenant Fund Trust's 'One Is Too Many' initiative²⁴ and a pledge to better document veterans whose cause of death is listed as suicide.²⁵ In addition, the withdrawal of troops from Afghanistan in 2021 has raised concern regarding MH and potential suicide risk.^{26 27} Therefore, it would be of benefit to conduct a systematic review of the literature to identify the prevalence and risk factors of suicide and suicidal ideation in British Armed Forces veterans.

METHODOLOGY

Literature search strategy

This systematic review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (figure 1).²⁸ Literature searches were conducted using PsycINFO, MEDLINE

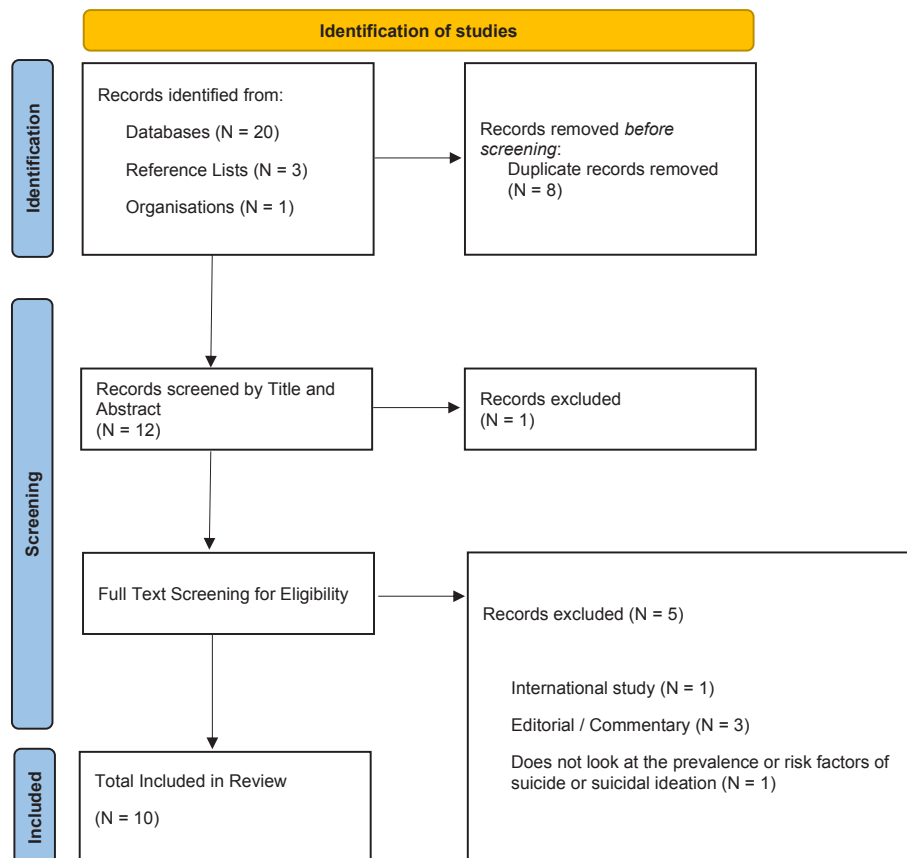


Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram of literature review publication selection.

and CINAHL databases. The selected databases offer a variety of indexes that provide comprehensive and up-to-date peer-reviewed publications. Grey literature was also included as part of this review to allow the inclusion of reports commissioned by organisations related to veterans including the Forces in Mind Trust, Armed Forces Covenant Fund Trust, Ministry of Defence (MOD), Royal British Legion and suicide (Samaritans). Each country's governmental literature was also searched for potential statistical information. Reference lists of reports and articles were also manually searched as was *BMJ Military Health* for any additional articles. There were no database limitations applied to the search. Due to the focus on the British Armed Forces, all publications were written in English and the earliest article in the original search dated back to 1980.

Inclusion–exclusion criteria

Articles that discussed suicide and suicidal ideation prevalence or risk factors among British Armed Forces veterans were eligible for review. Self-harm and associated synonyms were included within the search terms. However, self-harm was only included when discussed as a risk factor for suicide or suicidal ideation and not when discussed independently. Any form of review such as a systematic review or rapid review was not included. However, the reference lists were manually searched for any additional articles. Those discussing prevalence and risk factors for attempted suicide were also included due to the intent of completing suicide.

Articles that solely discussed serving personnel were not included in the review. In some publications, the findings for serving personnel and veterans were combined. Therefore, it is difficult to extrapolate data specifically related to veterans due to the combined nature of the results. However, publications that presented serving personnel and veterans' data separately were eligible for review.

Procedure

A literature search and screening of the titles and abstracts of the eligible articles were conducted by the second author. The full articles that met the inclusion criteria were equally split between three authors and screened against the inclusion criteria of the systematic review. The authors extracted data from the selected papers and completed the data extraction tables, followed by regular meetings to discuss and agree on inclusion.

The stages of the literature search were as follows:

- ▶ Initial search: keyword search using the criteria in [table 1](#).
- ▶ Removal of duplicates: Duplicates across databases were removed.
- ▶ Title and abstract screening: The relevancy of the titles and abstracts were checked.
- ▶ Full-text screening: Publications were then screened to check that the text included the prevalence or risk factors

of suicide or suicidal ideation in the British Armed Forces veteran population.

- ▶ Grey literature screening: Grey literature was also reviewed in accordance with the inclusion criteria.
- ▶ Reference list search: The reference lists of the included publications and grey literature were searched for additional articles.

RESULTS

The 10 included articles were published from 2008 to 2022. Of these, nine were quantitative articles and one adopted a mixed methods approach. Quantitative studies consisted of self-reporting surveys and database searching. The qualitative approach in the mixed methods study used interviews. Three studies directly compared the veteran population with a demographically matched civilian population. The current narrative considers the prevalence of suicide and suicidal ideation within the UK veteran population and also explores the risk factors that are within the included publications (see [table 2](#)).

Prevalence

There was a significant lack of research directly comparing the prevalence of suicide and suicidal ideation in the veteran community with the civilian population. However, of the research available, there was found to be no significant difference in rates of suicide.^{2 7 29} However, there was found to be increased risk in specific subgroups such as different age categories and ESLs. Rodway *et al*⁹ found that veterans had a marginally lower risk of suicide, though this difference was not significant. Death by suicide has been found to range from 6.6% to 7.6% of overall veteran deaths with civilians ranging from 7.8% to 8.4%, highlighting the small difference between the two groups. Bergman *et al*^{7 29} matched the civilian comparison population in areas such as age, gender and socioeconomic status with that of the veteran population to produce a highly valid comparison, ensuring that any differences were more likely due to veteran status. However, there was no information on personal factors that could influence suicide risk such as combat exposure and alcohol misuse.

In addition, statistics presented by the MOD explored the deaths of veterans who had been deployed to the Gulf and Falkland conflicts. Those deployed in the Gulf conflicts were found to have a statistically decreased risk of suicide compared with the general population.³⁰ Veterans deployed to the Falklands were found to have a 33% decreased risk compared with the UK general population.³¹ However, it is possible that there may have been suicides that were missed within these statistics as categories which may include suicidal deaths such as accidental deaths or deaths associated with drug/alcohol misuse were not included. These statistics appeared to match by age but did not consider gender or socioeconomic status, all of which could potentially influence rates of suicide.

Methods of suicide

The methods of suicide most commonly used among the UK veteran population were found to be hanging and strangulation.^{2 30} However, the method used did not differ from that of the civilian population, with differences only found across genders regardless of veteran status.²⁹ The least common method of suicide among veterans was found to be firearms, with as little as 2% using this method,^{2 30} and male veterans were less likely to use firearms than male civilians.²⁹ This contrasts with the USA, where firearms are the most common method of suicide,¹⁴ likely due to higher accessibility.

Table 1 Search parameters of the literature review

Search number	Field	Search words
S1	Title	Veterans or ex-servicemen or ex-serving or ex-soldiers or ex-military
S2	Subject	United Kingdom or UK or England or Britain or Scotland or Wales
S3	Subject	Suicide or self-harm or self-injury or suicidality or suicidal or self-harming or suicidal ideation
S4	S1 AND S2 AND S3	

Table 2 Summary of included papers and reports

Author	Type	Sample	Method	Results
Bergman <i>et al</i> ²⁹	Quantitative	56 205 veterans and 172 741 demographically matched civilians on age, gender and socioeconomic status	Scottish linked health records and mortality data; demographics provided by NHS electronic registration records; socioeconomic status determined from most recent registered postcode of residence; deaths were included, resulting from suicide, intentional self-harm or were undetermined	267 suicides (0.5%) in veterans compared with 918 (0.5%) in civilians; 7.6% of deaths in veterans and 8.4% of deaths in civilians. The difference was not statistically significant. Incidence was lower in younger veterans and higher in veterans over the age of 40. ESL's non-significantly increased risk but only in older age groups. Female veterans significantly at higher risk of suicide than female civilians. Veteran women who died by suicide joined before 1991, 50% left after <3 years and 0% served for >11 years. Methods of suicide did not differ significantly between veterans and civilians for either gender. In both groups, men were more likely to use violent methods. A significant interaction between birth cohort, veteran status and high risk is confined to the 1950–1954 cohort. No evidence of association with intense operations
Williamson <i>et al</i> ³²	Quantitative	204 veterans	Self-report experiences during military service Participants were asked whether they had experienced a challenging event during military service and asked to write a description. These were then classified by two researchers as a moral injury, non-morally injurious trauma or mixed. Probable PTSD was assessed with PTSD Checklist for DSM-5 (PCL-5), depression with the Patient Health Questionnaire-9 (PHQ-9), anxiety with the Generalised Anxiety Disorder Assessment (GAD-7), alcohol use with the Alcohol use disorders identification test (AUDIT) and SI with the Suicide Behaviours Questionnaire-Revised (SBQ-R). Combat exposure was assessed via Combat Exposure Scale with 17–41 score indicative of moderate–high exposure.	Served between 18 months and were exposed to non-morally injurious trauma; 15.2% mixed event; and 24.5% reported no exposure to a challenging event. Veterans who experienced morally injurious event were significantly more likely to meet case for PTSD, anxiety and SI.
Brewin <i>et al</i>	Mixed Methods	114 veterans with PTSD, 39 veterans with a physical disability	Veterans in receipt of a war pension recognising a PTSD diagnosis or physical disability due to service On average, veterans joined at 18 years old and served for 8.5 years. Major conflicts of NI, Persian Gulf, Bosnia. War-zone stress was assessed with Deployment Risk and Resilience inventory. Conducted interviews	Having a PTSD diagnosis and reporting a negative change in perception of the world are significantly related to predicting suicidal thoughts, plans or attempts. Not related to trauma exposure but rather to post-traumatic symptoms. In the interviews, perceptions of disillusionment about human nature and the rejection of civilian life were associated with suicidal thoughts, plans or attempts. Expected to be associated with negative self-views but found to be stronger in regard to alienation from civilian life
Bergman <i>et al</i> ⁷	Quantitative	78 000 veterans and 253 000 demographically matched civilians on age, gender and socioeconomic status	Data taken from the Scottish Veterans Health Study Demographic data obtained from electronic NHS registration records were linked at an individual level to death certificates to provide information on deaths by cause and to routine hospital admissions data and psychiatric inpatient records for information on any antecedent mental health diagnoses. Survival analysis to examine risk of suicide in veterans compared with civilians	Over the period of follow-up, there were 388 (0.5%) suicides among veterans (6.6% of all veteran deaths), and 1531 (0.6%) suicides in civilians (7.8% of all civilian deaths). However, direct comparison is misleading because of generally shorter follow-up in the veterans. Cox proportional hazard analysis, taking account of length of follow-up, demonstrated that there was no difference in risk of suicide overall between veterans and civilians.

Continued

Table 2 Continued

Author	Type	Sample	Method	Results
Kapur <i>et al.</i> 2008	Quantitative	Anyone who had left any of the three branches of the Armed Forces between first April 1996 and 31 st December 2005. 233 803 individuals were included. This represented 98% of those who were discharged.	The Database of those who had left the Armed Forces was linked with the database of the National Confidential Enquiry into suicide. This was compared with suicide rates of the general population.	224 individuals were found to have died by suicide after leaving the Armed Forces. Their median age was 22 years (19–29 years) and they were predominantly male (215/96%). Hanging or strangulation (99 cases(44%)) and self-poisoning (47 cases(21%)) were the most common methods of suicide. Deaths involving firearms occurred in only five cases (2%). The median time to death after leaving the services was 31 months (16–57 months). Although overall the rate of suicide was not greater than that in the general population, the risk of suicide in the two youngest age groups was approximately two to three times higher than in same age groups in the general population. For males aged 30–49 years the age-specific mortality ratios suggested that the risk of suicide was lower than for the same age groups in the general population.
Ministry of Defence	Quantitative	53 409 UK Armed Forces personnel that were deployed to the 1990/1991 Gulf Conflict Compared with 53 143 UK Armed Forces personnel of similar age, gender, service and rank who were in service on 1 January 1991 but were not deployed to the Gulf.	Comparison of the mortality rates of 53 409 UK Armed Forces personnel that were deployed to the 1990/1991 Gulf Conflict with those of a cohort that was not deployed. The statistics also compare the mortality rates of Gulf veterans and the comparison group with rates observed in the UK general population over the same time period in order to place the mortality rates for the Gulf and comparison cohorts in context.	There was no statistically significant difference between the rates of suicide for the Gulf and age-adjusted comparison cohorts, showing, across the whole time period there was no effect of deployment to Gulf 1 in terms of mortality rates for suicides. For both cohorts across the majority of the past 25 years, they had a statistically decreased risk of suicide when compared with the UK general population.
Rodway <i>et al.</i> ⁹	Quantitative	458 048 veterans who had served as regulars and had left the British Armed Forces between 1 January 1996 and 31 December 2018	A retrospective cohort study of personnel who left the UK Armed Forces; the main outcome was death by suicide after leaving service. The national databases of discharged British Armed Forces personnel were linked with the national database of deaths by suicide. Comparisons were made with the general population and serving personnel.	1086 (0.2%) died by suicide after leaving. Median age at death was 32 years (26–42 years). The majority (1046, 96%) were male. Around 19% (n=203) of the 1086 veterans who died by suicide were aged under 25 years; 63% (n=682) were aged between 25 years and 44 years; and 19% (n=201) were 45 years or older. The most common method of suicide was hanging or strangulation (n=672, 62%), followed by self-poisoning (n=155, 14%). Firearm deaths were rare (n=27, 2%). The risk of suicide for male veterans was similar to the risk of suicide in the age-matched general population. If anything, the standardised mortality ratio (SMR) and 95% CIs suggested the veterans' suicide rate was very slightly (but statistically significantly) lower than the rate in the general population (SMR 94 (95% CI 88 to 99)). However, the risk of suicide for the two youngest veteran age groups (16–19 and 20–24 years) was approximately two to three times higher than their counterparts in the general population. An increase in suicide risk was associated with male sex, being discharged from the British Armed Forces between the ages of 16 years and 34 years, being untrained on discharge, having served for less than 10 years and receiving an administrative, disciplinary, or medical discharge.
Bergman <i>et al.</i> ³⁴	Quantitative	56 206 Veterans	Retrospective, 30-year cohort study of 56 206 veterans, examined the association between previous self-harm and suicide, data retrieved from Scottish Health Records	Examined data on 266 vets. Fifty (18%) had a previous history of self-harm. The median time elapsed between the first record and fatal episode was 2 years. The mean age of veterans ending their life with a previous history of self-harm was 45.5 years. Only 9% of veterans who died as a result of suicide aged under 30 had a previous history of self-harm. While for veterans aged 50 and over at suicide, the figure was 26%.
Harden and Murphy ⁸	Quantitative	144 linked to SI, 259, no linkage to SI	Cross-sectional study; data drawn from veteran's engaging in MH treatment (provided by Combat Stress). Questionnaires sent to veterans. The provided data was then linked to risk assessment extracted from clinical records.	Age and ESL are significantly associated with SI. Veterans aged between 35 and 44, 45 and 54 were more likely to report SI. ESL was also more likely to have data related to SI. Unemployed veterans are at increased risk of SI compared with those employed, as well as the time veterans took to seek help and SI (>5 years to seek help at a decreased risk). Veterans with high predversity scores are at a higher risk of SI.
Ministry of Defence ³¹ 2014	Quantitative	1478 veteran deaths. Of those, 1171 (79%) were the result of disease related causes and 266 (18%) were the result of external causes of injury.	Summary statistics on the causes of deaths that occurred among the UK Armed Forces veterans of the Falkland war between 14 June 1982 and 31 December 2013. Stats are based on deaths in this time period that were reported to the MOD by 1 February 2014.	As of 31 December 2013, there were 1478 deaths among the Falkland veterans. Of these, 1171 (79%) were the result of disease-related causes, and 266 (18%) were the result of external causes of injury. The largest group of deaths due to external causes was due to intentional self-harm and events of undetermined intent (suicides and open verdict deaths) with 101 deaths (7% of all deaths). Of the 101 suicide or open verdict deaths, 13 occurred in-service. For each year between 1982 and 2013, there have been fewer than 10 deaths with a coroner confirmed suicide or open verdict. For the entire period, the risk of dying as a result of suicide for the Falkland veterans is no different from the UK general population.

ESL, early service leaver; MOD, Ministry of Defence; PTSD, post-traumatic stress disorder; SI, suicidal ideation; UKAF, UK Armed Forces.

Risk factors

There were numerous risk factors for suicide and suicidal ideation in UK veterans, including factors related to demographics such as age and gender, service history such as deployment, transition into civilian life, MH disorders such as post-traumatic stress disorder (PTSD) and a history of self-harm. The lack of literature suggests that there may potentially be risk factors that have not been fully explored or have been missed.

Demographics

Demographically, the age of the veteran was found to be a risk factor, though the age at which this may be has differed across the literature. Bergman *et al*²⁹ found that risk was lower in younger veterans but higher in those over the age of 40. Contrastingly, Kapur *et al*² found that the younger veteran groups were at two to three times higher risk than the civilian population with veterans aged 30–49 being at lower risk. This was also supported by Rodway *et al*.⁹ However, the latter studies did not control for socioeconomic factors, something which Bergman *et al*²⁹ ensured and could explain the contradictory findings. In support of Bergman *et al*,²⁹ Harden and Murphy⁸ found that veterans aged between 35 and 44 and between 45–54 were more likely to report suicidal ideation. However, this sample included only veterans who were seeking treatment, and the results may be skewed as it may be that younger veterans are least likely to seek help and therefore are at higher risk of suicide.

In addition to age, gender was also found to be a risk factor, particularly among female veterans who were found to be at higher risk of suicide than female civilians, and there were no statistical differences between male veterans and female veterans.²⁹ This could be due to women adopting the masculine and stoic culture surrounding the military, meaning that they are less likely to seek help for MH difficulties and are therefore at a higher risk of suicide than female civilians. However, Rodway *et al*⁹ found that overall, men were at an increased risk of suicide, though due to the veteran population being predominantly male, it is possible that this demographical difference may skew the results. Furthermore, there were significant interaction effects between gender and age among veterans with younger male veterans and older female veterans being at higher risk of suicide and/or suicidal ideation.^{7,9}

Service history and transition

The service history of the veteran, that is, their experiences during their time in the military, has been observed to be a risk factor. For example, veterans who served in the Royal Navy or Royal Air Force were at a reduced risk of suicide compared with those who had served within the British Army.⁹ In addition, those veterans who experienced what they believed to be classed as a morally injurious event were more likely to report suicidal ideation, suggesting that those involved in combat may be at increased risk of suicide.³² However, more recent research indicates that those who were deployed on combat operations were at a decreased risk of suicide,⁹ and this is supported by fatality statistics from the Gulf and Falkland wars showing that there is little to no difference compared with the general population.^{30,31} Veterans who experience an increase in suicidal ideation or suicide risk may be due to the symptoms such as nightmares and flashbacks that they are experiencing following a morally injurious event, rather than the exposure to the event itself.³³

ESLs were significantly more likely to report suicidal ideation and to be at higher risk of suicide.^{8,9} More specifically, those within the British Armed Forces who had not completed basic

training, served for less than 10 years or those who had been medically, administratively or dishonourably discharged.⁹ In addition, there are significant interaction effects between ESLs and demographics, with an increased risk in older age groups and female veteran ESLs.²⁹ Furthermore, some research implies that it may be difficulties during the transition that lead to an increased risk of suicide and/or suicidal ideation. Veterans who rejected the prospect of civilian life were more likely to report suicidal thoughts, plans and/or have made previous suicide attempts.³³ In addition, unemployed veterans were also at an increased risk of suicidal ideation,⁸ further highlighting that difficulties during the transition may be an increased risk factor for suicide and suicidal ideation, though the research is currently limited.

MH and self-harm

Veterans who took longer to seek help for MH difficulties reported more suicidal ideation,⁸ supporting the idea that veterans often fail to seek help until they are in crisis. As expected, mood disorders were found to be associated with increased risk of suicide, with veterans at a marginally higher risk compared with the general population, though this difference was not significant.³³ PTSD increased the risk of suicide in veterans compared with the civilian population and was found to be significantly related to suicidal thoughts, plans and previous attempts.^{7,33} This risk was found to be associated with the symptoms of those who were diagnosed with PTSD, such as living with a consistent paranoia and fear of death, with the exposure to a traumatic experience alone not necessarily associated with an increased risk of suicide.³³ This may be related to the help-seeking behaviour of the veteran population who often believe they can self-manage any MH symptoms. Furthermore, UK veterans who died by suicide were found to be at a non-significantly lower risk than their civilian counterparts of having a diagnosis of alcoholic liver disease,⁷ though this is focused on heavily excessive drinking to the point of liver damage and therefore may be different when looking at general alcohol misuse. Though these risk factors are not surprising, there is limited research into the associations of MH with suicide risk and suicidal ideation.

Bergman *et al*³⁴ found that 18% of veterans who died by suicide had a previous history of self-harm. These associations were lower in younger veterans under the age of 30 and higher in older veterans over the age of 50. In addition, 50% of veterans who had previously self-harmed also had a secondary diagnosis of a MH disorder, with 37% having a diagnosis of a mood disorder. As mood disorders have been found to be associated with an increased risk of suicide,⁷ it may be that there are significant interaction effects between self-harm, MH and suicide risk.

CONCLUSIONS

There is a scarcity of research regarding the prevalence and risk factors of suicide and suicidal ideation in veterans who served in the British Armed Forces, with direct comparisons with the civilian population being even less so. Overall, it appears that UK veteran suicide prevalence is broadly comparable to the UK general population. With veteran suicide being a national health crisis in the USA, like that of Canada, there remains questions over why these differences exist. The method of suicide appears to be a disparity with firearms being used in 71% of US veteran suicides compared with just 2% in UK veteran suicides.^{2,9} Further research may consider contextual influences in veteran suicide.

Risk factor research within a British armed forces context was also limited, with some literature conflicting. Factors such as the

age and gender of the veteran were found to influence suicide risk, with female veterans found to be at significantly higher risk than their civilian counterparts.²⁹ This finding is unexpected and provides evidence for the stoic culture of the military influencing attitudes towards MH and suicide; therefore, further research would be beneficial to explore this potential difference, though due to the veteran population being predominantly male, this may cause difficulty. In addition, service history and transition were found to be risk factors of suicide, though transition was under-researched despite the risk factor of ESLs being at increased risk of suicide and suicidal ideation.^{8,9} In addition, associations between suicide risk and MH and self-harm research is minimal, with only one article found looking into previous history of self-harm in veterans who died by suicide. To conclude, there is limited overall research in suicide and suicidal ideation in veterans within a British Armed Forces context, and further exploration and research are needed on the prevalence and risk factors.

Twitter Rebecca Randles @becky_randles

Contributors RR: coordination of review, inclusion decisions, writing of results and conclusion draft and editing. HB: conducting initial searches, inclusion decisions, writing of introduction draft and editing. NG: inclusion decisions, writing of methodology draft and editing. AF: final draft review and editing, guarantor of the publication.

Funding This systematic review was funded as part of the Armed Forces Covenant Fund Trust's 'One Is Too Many' programme (agreement reference 2018-108214), effective from 1 July 2021.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information. Data came from openly accessible articles and a table has been included to highlight the included papers and information.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Rebecca Randles <http://orcid.org/0000-0002-7401-5817>

A Finnegan <http://orcid.org/0000-0002-2189-4926>

REFERENCES

- Miller M, Barber C, Azrael D, *et al.* Suicide among US veterans: a prospective study of 500,000 middle-aged and elderly men. *Am J Epidemiol* 2009;170:494–500.
- Kapur N, While D, Blatchley N, *et al.* Suicide after leaving the UK armed forces — a cohort study. *PLoS Med* 2009;6:e1000026.
- Iversen AC, van Staden L, Hughes JH, *et al.* The prevalence of common mental disorders and PTSD in the UK military: using data from a clinical interview-based study. *BMC Psychiatry* 2009;9:68.
- Seal KH, Metzler TJ, Gima KS, *et al.* Trends and risk factors for mental health diagnoses among Iraq and Afghanistan veterans using department of veterans affairs health care, 2002–2008. *Am J Public Health* 2009;99:1651–8.
- Finnegan A, Randles R. Prevalence of common mental health disorders in military veterans: using primary healthcare data. *BMJ Mil Health* 2022:e002045.
- Randles R, Finnegan A. Veteran help-seeking behaviour for mental health issues: a systematic review. *BMJ Mil Health* 2022;168:99–104.
- Bergman BP, Mackay DF, Pell JP. Suicide among Scottish military veterans: follow-up and trends. *Occup Environ Med* 2022;79:88–93.
- Harden L, Murphy D. Risk factors of suicidal ideation in a population of UK military veterans seeking support for mental health difficulties. *J R Army Med Corps* 2018;164:352–6.
- Rodway C, Ibrahim S, Westhead J, *et al.* Suicide after leaving the UK armed forces 1996–2018: a cohort study. *MedRxiv* 2022.
- Rožanov V, Carli V. Suicide among war veterans. *Int J Environ Res Public Health* 2012;9:2504–19.
- Finnegan A, Finnegan S, Thomas M, *et al.* The presentation of depression in the British army. *Nurse Educ Today* 2014;34:83–91.
- Finnegan A, Finnegan S, McGee P, *et al.* Predisposing factors leading to depression in the British army. *Br J Nurs* 2010;19:1355–62.
- Crawford MJ, Sharpe D, Rutter D, *et al.* Prevention of suicidal behaviour among army personnel: a qualitative study. *J R Army Med Corps* 2009;155:203–7.
- U.S. Department of Veterans Affairs. 2022 national veteran suicide prevention annual report. 2022. Available: https://www.mentalhealth.va.gov/suicide_prevention/data.asp [Accessed 24 Feb 2023].
- Simkus K, Hall A, Heber A, *et al.* 2019 veteran suicide mortality study: follow-up period from 1976 to 2014. 2019. Available: <https://www.veterans.gc.ca/eng/about-vac/research/research-directorate/publications/reports/veteran-suicide-mortality-study-2019> [Accessed 24 Feb 2023].
- Jones K, Varker T, Stone C, *et al.* Defence force and veteran suicides: literature review. Melbourne, Australia Centre for Posttraumatic Mental Health; 2020. Available: <https://defenceveteransuicide.royalcommission.gov.au/publications/exhibit-08-0617-exp000100150004-phoenix-australia-defence-force-and-veteran-suicide-lit-review-3172020> [Accessed 24 Feb 2023].
- Rijs K, Bogers R. *Suicide mortality among deployed male military personnel compared with men who were not deployed*. Bilthoven, The Netherlands: National Institute for Public Health and the Environment, 2015.
- Pethrus C-M, Johansson K, Neovius K, *et al.* Suicide and all-cause mortality in Swedish deployed military veterans: a population-based matched cohort study. *BMJ Open* 2017;7:e014034.
- Värnik A, Kölves K, van der Feltz-Cornelis CM, *et al.* Suicide methods in Europe: a gender-specific analysis of countries participating in the "European alliance against depression." *J Epidemiol Community Health* 2008;62:545–51.
- Small Arms Survey. Global firearms holding. 2018. Available: <https://www.smallarmssurvey.org/database/global-firearms-holdings> [Accessed 24 Feb 2023].
- Hutson HR, Anglin D, Yarbrough J, *et al.* Suicide by cop. *Ann Emerg Med* 1998;32:665–9.
- de Similien RH, Okorafor A. Suicide by cop: a psychiatric phenomenon. *Am J Psychiatry Resid J* 2017;12:20–2.
- Clay O. Man wants to apologise to police officer who shot him. Liverpool Echo; 2022. Available: <https://www.liverpoolecho.co.uk/news/liverpool-news/man-wants-apologise-police-officer-23070436> [Accessed 03 Mar 2023].
- AFCFT. One is too many. Armed Forces Covenant Fund Trust; 2020. Available: <https://covenantfund.org.uk/programme/one-is-too-many/> [Accessed 24 Feb 2023].
- GOV.UK. Veteran suicide figures to be recorded for the first time. 2021. Available: <https://www.gov.uk/government/news/veteran-suicide-figures-to-be-recorded-for-the-first-time> [Accessed 24 Feb 2023].
- Bryant RA, Greenberg N, Forbes D, *et al.* The effect of the withdrawal from Afghanistan on military personnel's mental health. *Lancet Psychiatry* 2021;8:1026–7.
- House of Commons Defence Committee. Withdrawal from Afghanistan. 2023. Available: <https://publications.parliament.uk/pa/cm5803/cmselect/cmdfence/725/report.html> [Accessed 24 Feb 2023].
- Page MJ, McKenzie JE, Bossuyt PM, *et al.* The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71.
- Bergman BP, Mackay DF, Smith DJ, *et al.* Suicide in Scottish military veterans: a 30-year retrospective cohort study. *Occup Med (Lond)* 2017;67:350–5.
- Ministry of Defence. 1990/91 Gulf conflict, UK Gulf veterans mortality data, causes of death since 1 April 1991. 2021. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/576804/20161206_-_Gulf_1_Mortality_Statistics_Background_Quality_Report_REVISIED.pdf [Accessed 24 Feb 2023].
- Ministry of Defence. A study of deaths among UK armed forces personnel deployed to the 1982 Falklands campaign: 1982 to 2013. 2014. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/307098/20140428_Falklands_Statistical_Release-1982to2013.pdf [Accessed 24 Feb 2023].
- Williamson V, Murphy D, Stevelink SAM, *et al.* The impact of moral injury on the wellbeing of UK military veterans. *BMC Psychol* 2021;9:73.
- Brewin CR, Garnett R, Andrews B. Trauma, identity and mental health in UK military veterans. *Psychol Med* 2011;41:1733–40.
- Bergman BP, Macdonald EB, Mackay DF, *et al.* Healthy workers or less healthy leavers? Mortality in military veterans. *Occup Med (Lond)* 2019;69:570–6.