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# Military service and depression risk among American adults: a cross-sectional analysis based on NHANES data from 2011 to 2023

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## ABSTRACT

**Introduction** Depression is a common mental health disorder with high morbidity and disability rates. Military personnel are often considered a vulnerable population for depression, but epidemiological studies on the prevalence in veterans are limited. This study explores the relationship between military service and depression risk among American adults using a cross-sectional design based on National Health and Nutrition Examination Survey (NHANES) data from 2011 to 2023.

**Methods** This cross-sectional study used data from NHANES collected from 2011 to 2023. Depression was diagnosed based on the Patient Health Questionnaire-9 (PHQ-9) scores. Military service status was determined by responses to the demographic question. Binary logistic regression analysis was conducted to examine the association between military service and depression, as well as the factors influencing depression in veterans.

**Results** After data cleaning, a total of 25 949 participants were included, 2407 individuals with military service and 2548 with depression. In the unadjusted analysis there was no significant difference in the prevalence of depression between military service and non-service individuals. However, after adjustment, military service was associated with a 23% reduction in the risk of depression (OR 0.77, 95% CI 0.61 to 0.96). Subgroup analysis showed that, among non-Hispanic Black individuals, married persons, high-income individuals and those without hypertension, hyperlipidaemia or hyperglycaemia, the prevalence of depression was lower in the military cohort compared with the general population. Multivariable logistic regression analysis indicated that female gender and being divorced were risk factors for depression among veterans, while high income and absence of hypertension served as protective factors.

**Conclusion** Despite the relatively high prevalence of depression among active-duty and veteran military personnel, this large-sample cross-sectional study does not support the conclusion that military service increases the risk of depression. Furthermore, attention should be given to the depression risk among female and divorced veterans.

## INTRODUCTION

Depression is one of the leading causes of disability worldwide and severely impacts quality of life, health, interpersonal relationships and occupational potential, making it a significant public health issue.<sup>1</sup> In recent decades, the prevalence of depression has been increasing globally, driven by urbanisation, overall population growth and the changing

## WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Depression is a significant public health issue with high morbidity and disability rates, particularly among military personnel.
- ⇒ Previous studies suggest that military service may increase the risk of depression, but comprehensive epidemiological data on the prevalence of depression in veterans are limited.

## WHAT THIS STUDY ADDS

- ⇒ This large-sample cross-sectional study using NHANES data from 2011 to 2023 shows that military service is associated with a reduced risk of depression after adjusting for sociodemographic and health factors.
- ⇒ The study also identifies specific subgroups, such as female and divorced veterans, who may be at higher risk of depression.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

- ⇒ These findings suggest that military service may have protective effects against depression, contrary to some previous assumptions.
- ⇒ This study highlights the need for targeted mental health interventions for high-risk veteran subgroups and underscores the importance of further research to understand the complex relationship between military service and mental health.

age structure.<sup>2</sup> The mental health of military personnel, as a crucial component of military effectiveness, has attracted increasing attention. Due to the unique nature of the military environment and tasks, factors such as closed management, intensive training, adverse family events, lack of social support, deployment and exposure to combat can lead to a higher incidence of psychological issues.<sup>3</sup> Post-traumatic stress disorder (PTSD), depression, suicide and substance use disorders have become common mental health problems among active duty and veteran personnel, significantly affecting their quality of life.<sup>4</sup>

Depression is a major factor impacting the mental health of military personnel. Research indicates that members of the UK armed forces are more than twice as likely to screen positive for depression or anxiety compared with civilians.<sup>5</sup> Among US military personnel deployed to Afghanistan and Iraq, approximately 14–16% suffer from PTSD or



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**Table 1** Characteristics of the study sample

|                           | Served active duty in US armed forces |                |         | PHQ score $\geq 10$ |              |              |
|---------------------------|---------------------------------------|----------------|---------|---------------------|--------------|--------------|
|                           | Yes                                   | No             | P value | No                  | Yes          | P value      |
| Participants, N           |                                       |                |         |                     |              |              |
| Unweighted                | 2407                                  | 23 542         |         | 23 401              | 2548         |              |
| Weighted                  | 8847 416                              | 89206 647      |         | 89201 120           | 8852 943     |              |
| Age (years), median (IQR) | 63 (48, 73)                           | 45 (31, 60)    | <0.001  | 47 (32, 61)         | 46 (30, 59)  | <b>0.002</b> |
| Gender                    |                                       |                | <0.001  |                     |              | <0.001       |
| Men                       | 2222 (91.3%)                          | 10 316 (44.7%) |         | 11 600 (50.1%)      | 938 (37.0%)  |              |
| Women                     | 185 (8.7%)                            | 13 226 (55.3%) |         | 11 801 (49.9%)      | 1610 (63.0%) |              |
| Race                      |                                       |                | <0.001  |                     |              | <b>0.012</b> |
| Mexican American          | 124 (3.1%)                            | 3110 (8.9%)    |         | 2934 (8.4%)         | 300 (7.8%)   |              |
| Other Hispanic            | 117 (3.4%)                            | 2514 (7.1%)    |         | 2309 (6.6%)         | 322 (8.5%)   |              |
| Non-Hispanic White        | 1388 (75.8%)                          | 9578 (63.7%)   |         | 9817 (65.0%)        | 1149 (62.1%) |              |
| Non-Hispanic Black        | 588 (11.5%)                           | 4719 (11.0%)   |         | 4809 (10.9%)        | 498 (12.2%)  |              |
| Other race                | 190 (6.2%)                            | 3621 (9.4%)    |         | 3532 (9.1%)         | 279 (9.4%)   |              |
| Marital status            |                                       |                | <0.001  |                     |              | <0.001       |
| Married                   | 1516 (68.8%)                          | 12 654 (61.5%) |         | 13 179 (63.9%)      | 991 (45.1%)  |              |
| Unmarried                 | 739 (24.2%)                           | 5946 (22.6%)   |         | 5653 (21.3%)        | 1032 (38.1%) |              |
| Divorced or widowed       | 148 (6.9%)                            | 3594 (15.9%)   |         | 3361 (14.9%)        | 381 (16.7%)  |              |
| Education                 |                                       |                | <0.001  |                     |              | <0.001       |
| University and above      | 1586 (68.8%)                          | 12 926 (63.6%) |         | 13 351 (65.2%)      | 1161 (52.9%) |              |
| High school and below     | 817 (31.2%)                           | 9271 (36.4%)   |         | 8845 (34.8%)        | 1243 (47.1%) |              |
| Income                    |                                       |                | <0.001  |                     |              | <0.001       |
| Low                       | 507 (15.9%)                           | 7535 (25.4%)   |         | 6865 (22.7%)        | 1177 (42.2%) |              |
| Medium                    | 342 (11.6%)                           | 3159 (12.7%)   |         | 3129 (12.4%)        | 372 (15.5%)  |              |
| High                      | 1403 (72.4%)                          | 11 046 (61.9%) |         | 11 643 (64.9%)      | 806 (42.4%)  |              |
| Hypertension              |                                       |                | <0.001  |                     |              | <0.001       |
| Yes                       | 1238 (45.6%)                          | 8014 (30.5%)   |         | 8101 (31.0%)        | 1151 (40.6%) |              |
| No                        | 1166 (54.4%)                          | 15 505 (69.5%) |         | 15 278 (69.0%)      | 1393 (59.4%) |              |
| Hyperlipidaemia           |                                       |                | <0.001  |                     |              | <b>0.002</b> |
| Yes                       | 1206 (48.1%)                          | 7856 (32.6%)   |         | 8020 (33.6%)        | 1042 (38.2%) |              |
| No                        | 1181 (51.9%)                          | 15 271 (67.4%) |         | 14 994 (66.4%)      | 1458 (61.8%) |              |
| Hyperglycaemia            |                                       |                | <0.001  |                     |              | <0.001       |
| Yes                       | 547 (19.4%)                           | 2934 (9.5%)    |         | 2953 (9.9%)         | 528 (15.7%)  |              |
| No                        | 1860 (80.6%)                          | 20 995 (90.5%) |         | 20 439 (90.1%)      | 2016 (84.3%) |              |

PHQ, Patient Health Questionnaire.

depression.<sup>6 7</sup> The military environment can act as a catalyst for the development and progression of depression, with risks increased by separation from loved ones and support systems, combat-related stressors, and witnessing harm to oneself or others.<sup>8</sup> According to a 2012 report, about 15% of soldiers returning from deployment in the US military showed symptoms of depression.<sup>9</sup> Mental health issues during service can persist into retirement; a study based on DSM-IV structured clinical interviews indicated a lifetime prevalence of mental disorders among US Army National Guard soldiers of 61%, with a lifetime prevalence of depression at 23%.<sup>10</sup> Depression manifests through a variety of symptoms including low mood, loss of interest in activities, insomnia, weight loss or gain, psychomotor retardation, fatigue, decreased concentration, feelings of worthlessness and suicidal ideation, which severely affect both military performance during service and quality of life post-retirement.<sup>11</sup> Among veterans, depression also consumes substantial medical resources, increasing economic burdens.<sup>12</sup>

Psychological stress and adaptation are interrelated; military service can push psychological stress to its limits, but it can also shape self-perception, world views and mental health, enhancing coping skills.<sup>13</sup> While the association between combat

deployment during service and increased risks to mental health has been confirmed, it remains unclear whether general military service presents similar challenges. There has yet to be a large-sample study on the relationship between military service and the risk of depression. Therefore, this study uses data from five cycles of the NHANES database from 2011 to 2023 to explore the relationship between military occupational exposure and depression.

## METHODS

### Study design

This study is divided into two parts: the first part analyses the relationship between military service and depression, while the second part explores the factors influencing depression among veterans.

### Data source

The National Health and Nutrition Examination Survey (NHANES) is an annual survey conducted by the US government to collect health and demographic information from a representative sample of the US population. This study uses

**Table 2** Relationship between military service and depression

|           | Adjusted OR | 95% CI       | P value |
|-----------|-------------|--------------|---------|
| Model I   | 0.80        | 0.64 to 1.01 | 0.057   |
| Model II  | 0.85        | 0.69 to 1.06 | 0.146   |
| Model III | 0.78        | 0.62 to 0.99 | 0.039   |
| Model IV  | 0.77        | 0.61 to 0.96 | 0.024   |

raw data from five NHANES cycles: 2011–2012, 2013–2014, 2015–2016, 2017–2018, and 2021–2023.<sup>14</sup> Data from the 2019–2020 cycle regarding demographic variables (Demographic Variables and Sample Weights) were excluded due to the absence of information on military service. Participants aged <18 years and those with missing data on depression or military service were excluded from the study. Given the public availability of NHANES data, informed consent and ethical review board approval were not required.

### Depression diagnostic criteria

Depression was assessed using the Patient Health Questionnaire (PHQ-9), which consists of nine items designed to evaluate the frequency of depressive symptoms experienced in the past 2 weeks. Each symptom is scored from 0 to 3, corresponding to the response categories ‘not at all’, ‘several days’, ‘more than half the days’ and ‘nearly every day’. This screening tool aligns with the DSM-IV diagnostic criteria for depression. The total score across the nine items (DPQ010–DPQ090) is categorised as follows: 0–4 indicates no depressive symptoms, 5–9 indicates mild depression, 10–14 indicates moderate depression, and 15 or higher indicates severe depression. A PHQ-9 score of  $\geq 10$  is considered indicative of clinically significant depressive symptoms, establishing this threshold for diagnosing depression.

### Military occupational exposure

Military occupational exposure was defined based on participants’ responses to the question, “Have you ever served in the US Armed Forces?” Responses were categorised as a binary variable (1=Yes, 0=No).

### Variables

Sociodemographic variables were obtained from the DEMO questionnaire and included participants’ age, race, highest level of education, marital status, household income and employment status. Race was categorised as Hispanic, non-Hispanic White, non-Hispanic Black or other; highest education level was classified as high school or below versus college or above. Household income was stratified based on the family monthly poverty level index (PLI) from the Income questionnaire (INQ), categorised as  $\leq 1.30$  (low income), 1.30–1.85 (middle income) and  $> 1.85$  (high income).

Physical health status included the presence of comorbid conditions such as hypertension, diabetes and hyperlipidaemia. Responses to the question, “Has a doctor or health professional ever told you that you have high blood pressure?” were categorised as a binary variable (1=Yes, 0=No). Similar binary categorisations were made for hyperlipidaemia and diabetes based on corresponding questions in the Blood Pressure & Cholesterol questionnaire (BPQ) and Diabetes questionnaire (DIQ).

### Handling missing data

Values ‘7’, ‘77’, ‘777’ and ‘7777’ indicate refusal to answer, while ‘9’, ‘99’, ‘999’ and ‘9999’ indicate unknown status; both

were treated as missing data. Cases with missing values for the outcome variable (PHQ-9) and military occupational exposure were excluded, while other missing data were imputed using multiple imputation techniques.

### Statistical analysis

Statistical analyses were conducted using the R language survey package, applying weights for multicycle Mobile Exam Center (MEC) data. The participant identifier SEQN (a unique serial number for each participant) was used to link outcome variables with other data. The first part of the study developed four logistic regression models to elucidate the association between military service and depression. Model I was unadjusted for confounding factors; Model II was adjusted for age, gender and race based on Model I; Model III was further adjusted for education level, marital status and family monthly PLI; and Model IV was adjusted for health conditions including hypertension, hyperlipidaemia and diabetes based on Model III. The second part employed binary logistic regression analysis to investigate factors influencing depression among veterans, using stepwise regression to select models with the lowest Akaike Information Criterion (AIC) for multivariate analysis. Continuous variables were presented as median with interquartile ranges (IQR) and analysed using the Mann–Whitney test, while categorical data were expressed as n (%) and analysed using the  $\chi^2$  test. A p value of  $< 0.05$  was considered statistically significant.

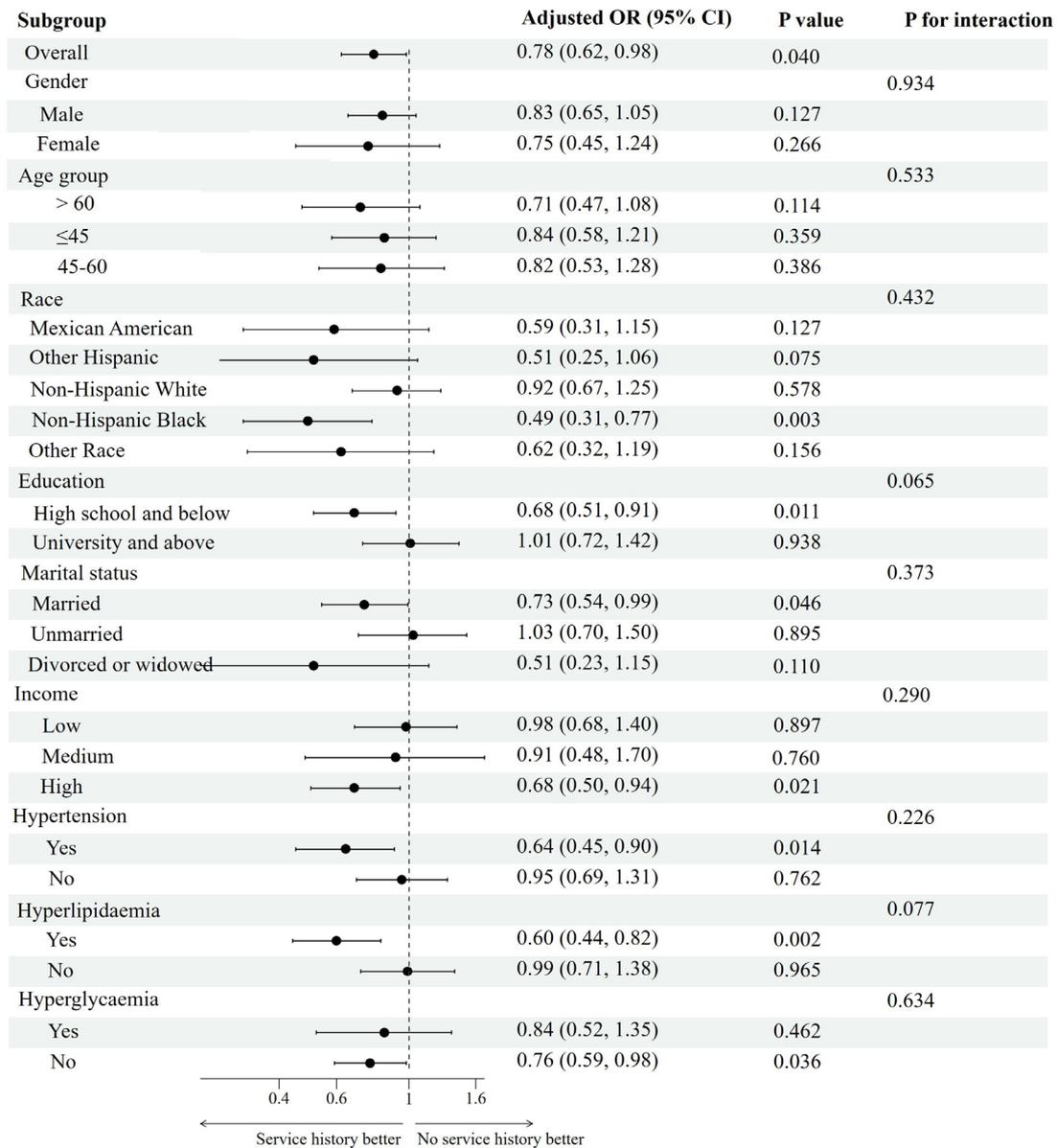
## RESULTS

### Characteristics of the study sample

The dataset comprised a total of 25 949 respondents. Among these, 2407 individuals had served in the military which, when weighted, corresponds to 8 847 416 people, while 23 542 had not served, representing 89 206 647 individuals. A total of 2548 individuals were identified as having depression, weighted to represent 8 852 943 people, and 23 401 individuals were without a depression diagnosis, corresponding to 89 201 120 people. The overall prevalence of depression was 9.3%, with a prevalence of 7.5% among those who had served in the military. Significant differences were observed in demographics, socioeconomic status and health conditions—including age, gender, race, marital status, education level, income, hypertension, hyperlipidaemia and diabetes—between individuals based on military service status and depression diagnosis. These characteristics are summarised in [table 1](#).

### Relationship between military service and depressive symptoms

To examine the relationship between military service and depressive symptoms, binary logistic regression analysis was conducted and the results are shown in [table 2](#). In the unadjusted model, no statistically significant relationship was found between military service and depression. After adjusting for age, gender and race, the association remained non-significant. However, further adjustments indicated that military service was associated with a



**Figure 1** Forest plot of subgroup analysis results.

22% reduction in the risk of depression (OR 0.78, 95% CI 0.62 to 0.99). After additional adjustments for health conditions such as hypertension, hyperlipidaemia and diabetes, military service showed a 23% reduction in the risk of depression (OR 0.77, 95% CI 0.61 to 0.96).

Subgroup analyses were conducted by stratifying participants based on factors such as gender, age, race, marital status, education level, income, hypertension, hyperlipidaemia, diabetes and deployment status. Age was categorised into three groups: ≤45 years, 45–60 years and >60 years. The subgroup analysis showed that, among non-Hispanic Black individuals, married individuals, those with high income, those with hypertension and those without diabetes, veterans had a lower incidence of depression compared with the general population. The findings from the subgroup analyses are shown in the forest plot in figure 1.

### Factors influencing depression among veterans

Focusing on the veteran participants, we analysed factors influencing depression by grouping respondents based on the presence or absence of depressive symptoms. Among the 2407

veterans, 213 were diagnosed with depression and 2194 were not. Univariate analysis showed that being female, unmarried or divorced were significant risk factors for depression, while high income and the absence of hypertension were found to be protective factors. Multivariate analysis confirmed that being female and divorced were significant risk factors, whereas high income and the absence of hypertension provided protective benefits against depression. Notably, deployment status did not emerge as a significant factor influencing depression. The results of the logistic regression analysis regarding factors affecting depression among veterans are shown in table 3 and figure 2.

### DISCUSSION

The reported prevalence of depression among the general population and veterans varies significantly across studies. A recent investigation found that the prevalence of depression among US adults is approximately 8%.<sup>15</sup> In contrast, a meta-analysis showed that the rates of depression among active-duty military personnel and veterans are 23% and 20%, respectively.<sup>16</sup> In this extensive retrospective study, the unadjusted prevalence of depression

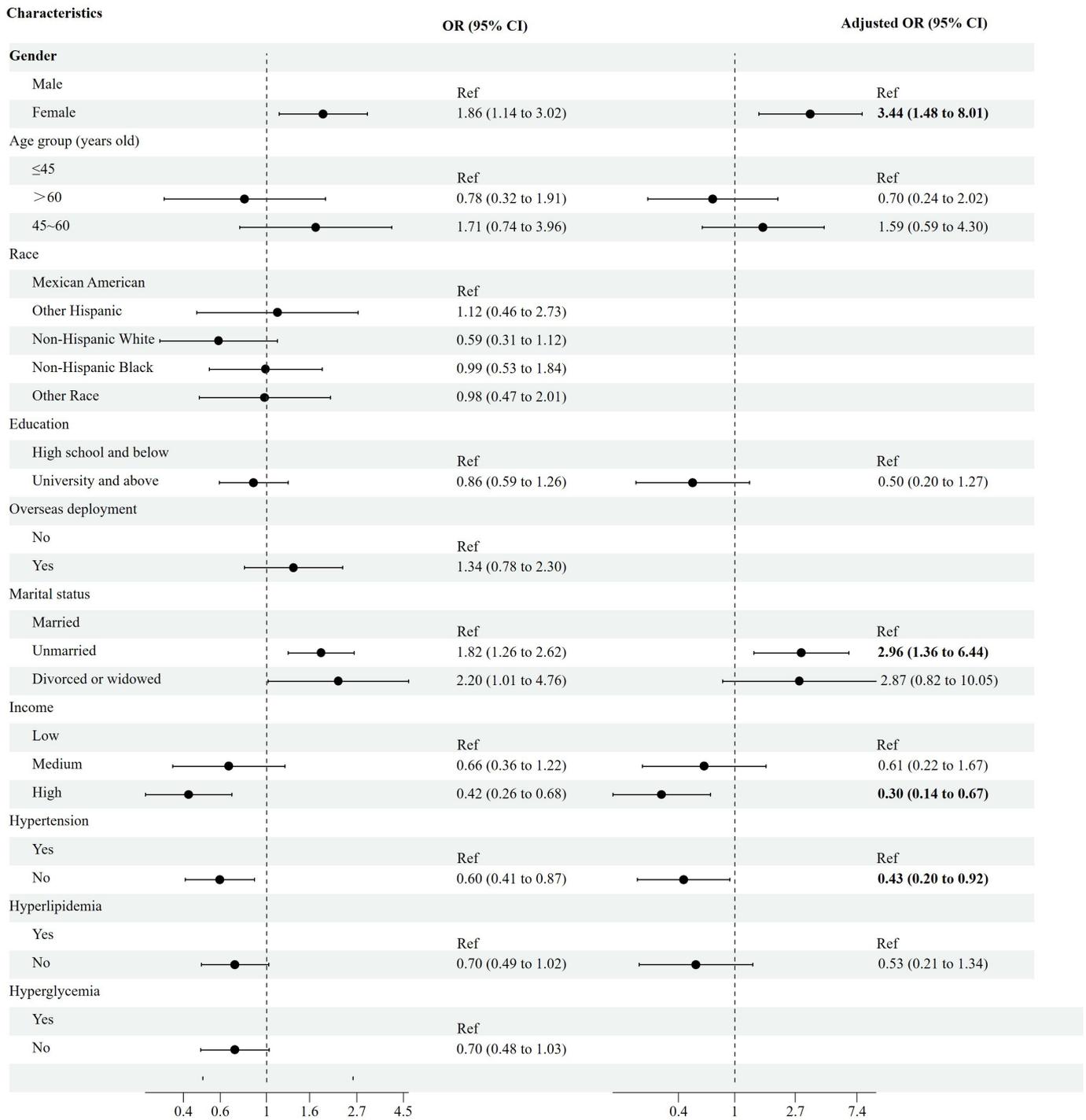
**Table 3** Analysis of factors influencing depression in veterans

| Characteristic        | Univariable |              |         | Multivariable |               |         |
|-----------------------|-------------|--------------|---------|---------------|---------------|---------|
|                       | OR          | 95% CI       | P value | OR            | 95% CI        | P value |
| Gender                |             |              |         |               |               |         |
| Men                   | –           | –            |         | –             | –             |         |
| Women                 | 1.86        | 1.14 to 3.02 | 0.013   | 3.44          | 1.48 to 8.01  | 0.005   |
| Age group (years)     |             |              |         |               |               |         |
| ≤45                   | –           | –            |         | –             | –             |         |
| >60                   | 0.78        | 0.32 to 1.91 | 0.586   | 0.70          | 0.24 to 2.02  | 0.499   |
| 45~60                 | 1.71        | 0.74 to 3.96 | 0.202   | 1.59          | 0.59 to 4.30  | 0.355   |
| Race                  |             |              |         |               |               |         |
| Mexican American      | –           | –            |         | –             | –             |         |
| Other Hispanic        | 1.12        | 0.46 to 2.73 | 0.792   |               |               |         |
| Non-Hispanic White    | 0.59        | 0.31 to 1.12 | 0.107   |               |               |         |
| Non-Hispanic Black    | 0.99        | 0.53 to 1.84 | 0.966   |               |               |         |
| Other race            | 0.98        | 0.47 to 2.01 | 0.950   |               |               |         |
| Education             |             |              |         |               |               |         |
| High school and below | –           | –            |         | –             | –             |         |
| University and above  | 0.86        | 0.59 to 1.26 | 0.447   | 0.50          | 0.20 to 1.27  | 0.142   |
| Overseas deployment   |             |              |         |               |               |         |
| No                    | –           | –            |         | –             | –             |         |
| Yes                   | 1.34        | 0.78 to 2.30 | 0.281   |               |               |         |
| Marital status        |             |              |         |               |               |         |
| Married               | –           | –            |         | –             | –             |         |
| Unmarried             | 1.82        | 1.26 to 2.62 | 0.002   | 2.96          | 1.36 to 6.44  | 0.007   |
| Divorced or widowed   | 2.20        | 1.01 to 4.76 | 0.046   | 2.87          | 0.82 to 10.05 | 0.096   |
| Income                |             |              |         |               |               |         |
| Low                   | –           | –            |         | –             | –             |         |
| Medium                | 0.66        | 0.36 to 1.22 | 0.182   | 0.61          | 0.22 to 1.67  | 0.324   |
| High                  | 0.42        | 0.26 to 0.68 | <0.001  | 0.30          | 0.14 to 0.67  | 0.004   |
| Hypertension          |             |              |         |               |               |         |
| Yes                   | –           | –            |         | –             | –             |         |
| No                    | 0.60        | 0.41 to 0.87 | 0.008   | 0.43          | 0.20 to 0.92  | 0.031   |
| Hyperlipidaemia       |             |              |         |               |               |         |
| Yes                   | –           | –            |         | –             | –             |         |
| No                    | 0.70        | 0.49 to 1.02 | 0.065   | 0.53          | 0.21 to 1.34  | 0.176   |
| Hyperglycaemia        |             |              |         |               |               |         |
| Yes                   | –           | –            |         | –             | –             |         |
| No                    | 0.70        | 0.48 to 1.03 | 0.067   |               |               |         |

among veterans did not differ significantly from that of other populations; however, after controlling for confounding factors, military service was associated with a 23% reduction in the risk of depression (OR 0.77, 95%CI 0.61 to 0.96). Additionally, subgroup analyses indicated that, among non-Hispanic Black individuals, married individuals and those with high income as well as individuals with hypertension and hyperlipidaemia, military service correlated with a lower risk of depression.

Military service is often closely linked to mental health challenges. Factors such as rigorous training, a restrictive living environment, limited social support, reduced personal privacy, cultural differences and deployment contribute to the prevalence of mental health issues like anxiety, depression and suicide within the military.<sup>17</sup> Furthermore, stigma surrounding mental healthcare and the associated feelings of shame can lead to an under-reporting of these conditions.<sup>18</sup> Despite this, the exact prevalence of mental disorders among military personnel remains uncertain, and there is a lack of large-scale epidemiological studies comparing the risk of depression between military personnel and the general population. Previous research has indicated that the incidence of

depressive symptoms among veterans is nearly double that of the general population; however, these studies often involve samples drawn from healthcare systems, which may not accurately represent the broader community.<sup>19 20</sup> The NHANES database used in this study provides a representative sample of the US population, confirming that military service may, in fact, serve as a protective factor against depression after adjusting for sociodemographic variables. A study by Gould *et al* found no significant association between military service and increased depressive or anxiety symptoms among male veterans compared with non-veterans, after controlling for sociodemographic factors.<sup>21</sup> The prevalence of depression among veterans also varies by era of service; for instance, Vietnam War veterans tend to exhibit higher rates of depression compared with those from World War II and the Korean War.<sup>22</sup> The relationship between military service and mental health is complex and bidirectional, with military environments also fostering psychological resilience and reducing depressive symptoms.<sup>23</sup> Additionally, a large-scale study of Chinese military personnel indicated that their rates of depression are lower than those in the general population.<sup>24</sup>



**Figure 2** Forest plot of factors influencing depression among veterans.

This study identifies female gender and divorce as significant risk factors for depression among veterans, while high income and the absence of hypertension are protective factors. Previous research supports these findings, highlighting similar risk factors for depression among veterans, including being female, lacking a partner, insufficient physical activity and smoking.<sup>7,25</sup> An epidemiological study found that the incidence of depression among women is 1.5 times that of men and is increasing.<sup>26</sup> In this study, the risk of depression was 3.44 times higher in women than in men (OR 3.44, 95% CI 1.48 to 8.01), which was higher than that of the general population. The additional stressors and unique experiences associated with military service, such as deployment

and combat exposure, may exacerbate these gender differences in depression risk among veterans. Similarly, the finding that being divorced is a risk factor for depression among veterans aligns with broader trends observed in the general population. Divorce is known to be a significant stressor that can contribute to mental health issues, including depression. The military environment, with its demands on family life and frequent separations, may place additional strain on relationships and increase the likelihood of divorce, thereby further elevating the risk of depression among divorced veterans. All of this further raises the risk of suicide in divorced veterans. This highlights the importance of addressing relationship stress and providing support for veterans

and their families to mitigate the risk of depression and suicide. This reminds us that social support and psychological assistance should be provided to help officers and soldiers cope with the breakdown of relationships and other life stressors. In addition, family members and society should give more love and support to help them release stress in family life. Gulf War veterans are reported to be more than twice as likely to experience depression compared with their non-deployed counterparts<sup>27</sup> but, in this research, deployment status was not found to significantly influence depression.

In this study, depression was diagnosed based on the PHQ-9 scores, with a score of  $\geq 10$  indicating clinically significant depressive symptoms. This threshold is widely used to identify individuals who may benefit from further evaluation and treatment for depression.<sup>28</sup> However, it is important to note that sub-threshold symptoms, which do not meet the full diagnostic criteria for depression, can still have a significant impact on mental health and functioning. Veterans are known to under-report on self-report measures due to stigma and other barriers.<sup>29</sup> Therefore, it is crucial to consider sub-threshold symptoms in the assessment and management of mental health in veterans. Future research should explore the prevalence and impact of sub-threshold symptoms in veterans and develop targeted interventions to address these issues. It is worth noting that insufficient self-reported under-reporting and sub-threshold symptom underestimation of the incidence of depression may also be a contributing factor to the reduced risk of depression from military occupational exposure.

This study has several limitations including its cross-sectional design, the lack of comprehensive data on veterans' combat experiences and the potential confounding effect of age. Furthermore, the occurrence of depression is influenced by numerous factors such as type of service, duration of service, exposure to negative events and serious illness.<sup>30</sup> However, the fixed nature of variables in the NHANES database limited the ability to analyse life events pertinent to depression in this study. Additionally, determining whether participants are still serving in the military and the time span of service is challenging, as the NHANES data do not provide information on current military status. This limitation may affect the accuracy of the results and the interpretation of the findings.

## CONCLUSION

While the prevalence of depression is notably high among both active-duty personnel and veterans, this large-sample cross-sectional study does not support the conclusion that military service increases the risk of depression. Furthermore, attention should be given to the heightened risk of depression among female and divorced veterans.

**Contributors** GJM, SF and SXL designed the study. GJM, RYL and LYC collected the data. GJM and SF conducted the statistical analysis. GJM and SXL completed the first draft of the manuscript. All authors contributed to and approved the final manuscript. GJM is responsible for the overall content as guarantor.

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**Competing interests** None declared.

**Patient consent for publication** Not applicable.

**Ethics approval** The data used in this study were obtained from the National Health and Nutrition Examination Survey (NHANES), which is a publicly available dataset. The NHANES study protocol was approved by the NCHS Research Ethics Review Board (Protocol #2011-17, Protocol #2018-01, and Protocol #2021-05). Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** Data are available in a public, open access repository. The data used in this study were obtained from the National Health and Nutrition Examination Survey (NHANES), which is a publicly available dataset. The specific data used in this study can be accessed through the NHANES website at <https://www.cdc.gov/nchs/nhanes/index.html>. No new datasets were generated or analysed for this study. The data used are fully available without restriction.

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