The Global Prevalence of Depression, Suicide Ideation, and Attempts in the Military Forces: A Systematic Review and Meta-Analysis of Cross Sectional Studies

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Research Article

Keywords: Suicide ideation, Suicide Attempts, Depression, Military, Systematic Review and Meta-Analysis

DOI: https://doi.org/10.21203/rs.3.rs-274705/v1

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Abstract

Background

Given the wide range of depressive disorders, suicidal ideation and suicide attempts in various military studies around the world, determining the exact prevalence of these disorders in line with health planning as well as care and treatment service designing for military forces can be useful. The aim of the present meta-analysis was to determine the pooled prevalence of depressive disorders, suicide thoughts, and attempts in the military.

Methods

The present systematic review and meta-analysis study was performed based on PRISMA criteria in 5 steps of the search strategy, screening and selection of articles, data extraction, evaluation of article quality and meta-analysis. International databases (PubMed, Scopus, Web of Sciences, Embase, Cochrane, PsycInfo) were searched using related keywords extracted from Mesh and Emtree. After screening and final selection of articles, data were extracted and qualitative evaluation was performed using the NOS checklist.

Results

The results of meta-analysis showed that the prevalence of depression in active military forces and veterans was 23% (%95 CI: 20–26 %) and 20% (%95 CI: 18–22 %), respectively. In addition, the prevalence of suicidal ideation and attempts in the military was 11% (%95 CI: 10–13 %) and 11% (%95 CI: 9–13 %), respectively. The prevalence of suicide ideation and attempts in drug-using military was 18% (%95 CI: 7–33 %) and 30% (%95 CI: 23–36 %), respectively. The prevalence of suicidal ideation and attempts in military consuming alcohol were 9% (%95 CI: 4–13 %) and 8% (%95 CI: 7–10 %), respectively. In militaries with AIDS / HIV, the prevalence of suicide attempts was 5% (%95 CI: 4–8 %).

Conclusion

Therefore, it is necessary to develop and design training and intervention programs in order to increase the awareness of the military, especially veterans, to prevent the occurrence of suicide and depression.

Background

Mental health is one of the basic pillars of health that requires a useful, effective and satisfactory individual life (1). Promoting the mental health of a society requires the dynamism and growth of that society (2). Paying attention to mental health in all areas of life, including personal, social and professional ones, is important and debatable. One of the areas in which mental health is concerned is the job and profession. Based on the available findings, mental disorders are one of the most important and significant causes of diseases and it was predicted that in 2020 the share of mental and neurological disorders in the total burden of diseases would increase by 50% (3-5). Therefore, attention to mental health is important in all areas of the individual, social and professional life (6, 7). One of the important stressful environmental stimuli that can cause chronic stress and significantly affect people's psyche is the type of the job in which a person is engaged so that if the stress caused by the work environment becomes excessive, it can cause physical and psychological effects on the individual and his/her family. It can be said that it endangers the health of the individual and threatens the organizational goals and leads to a decrease in the quality of the individual's performance. Research has shown that several factors affect job stress (8-10). These include shift work, or jobs which are full of environmental stress. If a person is not able to cope with the stressors of his/her job, he/she will suffer from multiple physical, psychological and behavioral consequences. In this regard, the military forces of different countries perform different missions according to the conditions of the region and their countries, but during this decade, in order to provide higher defense capability and presence at greater depths and distances away from the origin, military forces need to design and make tools with higher ranges and quality, which need their own engineering and ergonomic requirements (11-13). One of the most important issues in this field, which can be the first question and has caused intellectual and executive concern of military officials and commanders, is to identify and implement methods to increase the durability and maintain the performance of military personnel so that during increasing mission time, their efficiency will not be disrupted or effectively reduced(14, 15). This is where the role of military psychology and psychological variables affecting the effectiveness of military forces become clearer (16, 17). Psychological assessment and mental disorders are very important among military personnel because war, living in operational conditions, multiple combat missions, being away from the family, captivity, wounding and environmental restrictions, as well as cultural differences are always parts of the military life. Therefore, due to this type of lifestyle, burnout, job stress and various mental disorders such as depression and suicide are very common among them (18, 19). For this reason, conducting epidemiological and psychological research among military personnel is of great importance. In addition, accurately determining the prevalence of mental disorders in this group can help health policy makers and health professionals to take more effective and appropriate control and treatment measures (20, 21). On the other hand, the military forces' awareness of the occurrence of these disorders can be effective in performing appropriate health behaviors, suitable lifestyle changes, and ultimately in preventing further occurrence of these disorders. So far, various descriptive and
analytical studies have been conducted in the world with the aim of determining the prevalence of mental disorders, especially depression and suicide in servicemen in various fields such as naval, land and air forces, but the results of these studies were very contradictory. In addition, the range of prevalence, considering the results of these studies, was very wide such that the exact prevalence of mental disorders in this group could not be considered (22-24). Therefore, it was very important to conduct a systematic review and meta-analysis in order to more accurately determine the prevalence of depressive and suicidal disorders (suicide thoughts and attempts). On the other hand, by considering the results of the systematic review and meta-analysis study, it was possible to create appropriate knowledge and determine the exact prevalence of these disorders in the military in order to allocate health care resources and screening services to the military. The purpose of this systematic review and meta-analysis was to determine the exact prevalence of depressive disorders and suicide in the military of the world.

**Methods**

This systematic review and meta-analysis was based on the standards Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and Meta-analyses of Observational Studies in Epidemiology (MOOSE) (25-27).

**Search syntax and Search strategy**

This study was a systematic review and meta-analysis that aimed to accurately determine the prevalence of depression, suicide thoughts, and suicide attempts in the military. Finding of articles published from January 1990 to December 2020 was done in 5 electronic databases (PubMed (Medline), Scopus, Web of science, Embase, Ovid, PsycInfo) using the main keywords of Depression (synonymous with "Depressively", "Depressive Disorder", "Depressed", "Depressive Symptoms", "Emotional Depression", "Unipolar Depression", "Neurotic Depression", "Depressive Syndromes", "Endogenous Depression", and "Depressive Neurosis"), suicide thoughts and attempts (with synonyms of "Suicide", "Suicidality", "Attempted Suicide", "Para Suicide", "Completed Suicide", and "Thoughts of Suicide"), as well as Military people (with synonyms of "Armed Forces Personnel", "Military Personnel", "Air Forces Personnel", "Veterans", "Submariners", "Marines", "Navy Personnel", "Sailors", "Soldiers", "Military Deployment", and "Coast Guard ").

**Eligibility criteria's**

Cross-sectional studies aim of which were to determine and report the prevalence or frequency of depressive disorders, suicide thoughts, or attempts in the military were entered into the research. This means that studies in which the study population was the military, and the main outcome of which was to determine the prevalence of depression and suicide (suicide thoughts or attempts) were considered in this review. Studies included in the systematic review should have reported desired outcomes (the prevalence of depressive disorders and suicide) in frequency and percentage.

Studies that had reported depressive and suicidal disorders (suicidal idea or attempts) as a mean and standard deviation, or ones of which target population was other than military personnel themselves (such as military spouses or their children), retrospective, or prospective studies with the cohort base, cohort studies, case studies, clinical trials, systematic reviews, letters to the editor, editorial, and survey studies over 5 years were excluded from the present research.

The search strategy was independently developed and conducted by two of the authors and the existing differences were resolved in the opinion of the third researcher with more experience. Gray Literature-related sites and databases such as PsycInfo, Google Scholar, World Health Organization (WHO) were also searched. In addition, Manual Search was performed at the end of the screening process.

**Screening and selection of articles**

First, an Endnote library (Version 8) was created to collect articles, remove duplicates, and review titles and abstracts. In the first screening step, the review of titles and abstracts was independently done by one of the researchers and 10% of the reviewed articles were randomly reviewed by the second researcher and the differences were resolved by discussing and referring to the third person if necessary. The screened references were selected for full-text review if they contained the desired information in their title or abstract. In the next step, the full text was separately reviewed by two of the authors. Data were extracted from the eligible studies and entered into Excel 2016.

**Data extraction**

In order to extract the data, first a checklist was prepared with the opinion of experts in relation to the data extracted from the articles and then the data were extracted. Required information included author's name, year of publication of articles, statistical population of study, country of study, type of study, instrument for measuring depression and suicide disorders in the military, sample size, average age of military personnel and quality evaluation score of primary studies.

**Risk of Bias**
Two of the authors conducted a qualitative evaluation of the studies based on the Newcastle - Ottawa Quality Assessment Scale (NOS) checklist(28, 29). This checklist has designed to evaluate the quality of observational studies, especially cross-sectional ones. This tool examined each study with 6 items in three groups, including: how to select study samples, how to compare and analyze study groups, and how to measure and analyze the desired outcome. Each of these items was given a score of 1 if it was observed in the studies, and the maximum score for each study was 9 points. In case of discrepancies in the score assigned to the published articles and for reaching an agreement, the discussion method and the third researcher were used.

Meta-analysis

In this research, for meta-analysis, first, the prevalence values were extracted from the selected studies, and then the standard error prevalence values for each study were calculated using the Metan command. In addition to performing this order, the number of patients with the desired outcome (depression or suicide) was extracted from the total sample size in each of the studies to perform the Metaprop order. In this research, the model of DerSimonian-Liard random effects was used to estimate the pooled prevalence of depression and suicide (estimate of 95% confidence interval) in military personnel using the Metaprop and Metan commands in Stata 16. Cochrane Q and I2 tests were used to investigate the heterogeneity and variance between the studies selected for meta-analysis. Funnel Plot and Egger test were used to evaluate the diffusion bias. Also, meta-regression analysis and diagram were used to investigate the relationship between age variables with the estimated pooled prevalence.

Results

Qualitative Results

In this systematic review and meta-analysis study after conducting the search strategy, screening of articles was done based on title, abstract and full text. On the topic of depression in the military, 3422, 1773, 343, 445, and 11 articles were retrieved at PubMed, Embase, Web of Sciences, Scopus, and PsycInfo, respectively. On the subject of suicide (thoughts or attempts), 1551, 1036, 170, 346, and 10 articles were retrieved on PubMed, Embase, Web of Sciences, Scopus, and PsycInfo, respectively. After removing duplicates, in the Endnote software, screening based on the title of the articles was started with 5275 studies related to depression and 3022 studies related to suicide. After screening articles by the title, 3531 studies related to depression and 1842 studies related to suicide were excluded because they were not relevant to the study objectives. 1744 studies related to depression and 1180 studies related to suicide were entered into the screening phase based on the abstract. Finally, at this stage, 2458 articles (a total of 1499 and 959 studies) related to depression and suicide in the military were deleted. After full-text screening, 133 studies related to depression and 58 studies related to suicide in the military remained and were included in the present study for meta-analysis (Fig. 1).

Of the total studies entered into this systematic review on depression, 94 studies in the USA, 4 studies in the UK, 11 studies in Canada, 2 studies in Korea, 2 studies in Turkey, 2 studies in Croatia, 1 study in Russia, 2 studies in China, 1 study in Argentina, 1 study in New Zealand, 1 study in Iran, 1 study in Iraq, 1 study in Norway, 1 study in Australia, 1 study in Greece, 1 study in Sweden, 1 study in Pakistan, 2 studies in Lebanon, 2 studies in Thailand, and 1 study in Finland had been conducted. Also, 84 out of 133 studies related to the prevalence of depression in the military had collected study samples by the available sampling method and the rest of the studies had used the random sampling method. Finally, the whole of these studies had examined 2166819 military personnel of whom 356140 were depressed (Tables 1 and 2).
| Authors                  | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method                  | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|--------------------------|---------|---------------------------------|------------------|-----------------------------------------------|------------|-------------|-------------------------------|-----------|
| Tredgold, R. F. (1941)(65) UK | Convenience Sampling (CS) | Army men | Clinical Symptoms (Interviews) | - | 274 | 70 (25.54%) | 6 |
| Helzer, J. E. et al (1976) USA | Random Sampling (CS) | Army men | Clinical Symptoms (Interviews) | - | 470 | 122 (26 %) | 7 |
| Levine, M. E. (1982) USA | Convenience Sampling (CS) | Army men | Beck Depression Inventory (BDI) | 17 | 200 | 36 (18 %) | 6 |
| Deeken, M. G. et al (1987) USA | Convenience Sampling (CS) | Army men | Zung Self-Rating Depression Scale | - | 298 | 47 (15.77 %) | 7 |
| Ritchie, E. C. et al (1992) USA | Random Sampling (CS) | Army men with HIV | Clinical Symptoms (Interviews) | - | 50 | 21 (42 %) | 7 |
| Brown, G. R. et al (1993) USA | Random Sampling (CS) | Air Forces men with HIV | Structured Interview Guide for the Hamilton Anxiety and Depression Scales (SIGH-AD) | 35 | 442 | 99 (22.4 %) | 8 |
| McCarroll, J. E. et al (1993) USA | Convenience Sampling (CS) | Army men and women | Clinical Symptoms (Interviews) | 25.4 | 1835 | 87 (4.7 %) | 8 |
| Perconte, S. T. et al (1993) Russia | Convenience Sampling (CS) | Army men and women | Beck Depression Inventory (BDI) | 29.25 | 591 | 146 (24.70 %) | 7 |
| Serfaty, E. et al (1995) Argentina | Random Sampling (CS) | Army men and women | NR | NR | 553 | 25 (4.5 %) | 7 |
| Lish, J. D. et al (1996) USA | Random Sampling (CS) | Army men and women | Brief self-report questionnaire (SCRENNER) | 21.2 | 669 | 38 (5.81%) | 7 |
| Long, N. et al (1996) New Zealand | Random Sampling (CS) | Army men | Beck Depression Inventory (BDI) | 50 | 751 | 11 (1.46%) | 7 |
| Schwartz, D. A. et al (1997) USA | Random Sampling (CS) | Non-Persian Gulf War (PGW) military personnel | Self-report | - | 923 | 157 (17 %) | 6 |
| Schwartz, D. A. et al (1997) USA | Random Sampling (CS) | Persian Gulf War (PGW) military personnel | Self-report | - | 923 | 99 (10.9 %) | 6 |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|---------------------------------|------------------|-----------------------------|------------|-------------|-------------------------------|-----------|
| David, D. et al (1999) (77) | Croatia | Convenience Sampling (CS) | Veterans after participation in Homeland War in Croatia | The Structured Clinical Interview Diagnostic and Statistical Manual (SCID) | 36.2 | 91 | 35 (38.5 %) | 7 |
| Hankin, C. S. et al (1999) (78) | USA | Random Sampling (CS) | Men Veterans | Center for Epidemiologic Studies Depression Scale (CES-D Scale) | 62 | 2160 | 676 (31.3 %) | 7 |
| Hourani, L. L. et al (1999) (79) | USA | Random Sampling (CS) | Men and Women in the Navy and Marine Corps | Center for Epidemiologic Studies Depression Scale (CES-D Scale) | 20–64 | 782 | 125 (16.08%) | 7 |
| Curran, G. M. et al (2000) (80) | USA | Random Sampling (CS) | Men Veterans | (Beck Depression Inventory)BDI( | 43 | 298 | 116 (39 %) | 7 |
| Menon, A. S. et al (2000) (81) | USA | Convenience Sampling (CS) | Men Veterans | The Structured Clinical Interview for DSM-III-R (SCID-III-R) | 55 | 295 | 59 (22.8 %) | 6 |
| Kozaric-Kovacic, D. et al (2001) (82) | Croatia | Random Sampling (CS) | Men Veterans | The Hamilton Depression Rating Scale (HAMD) | 34 | 249 | 77 (31 %) | 7 |
| Sayar, K. et al (2001) (83) | Turkey | Random Sampling (CS) | Men Soldiers | (Beck Depression Inventory)BDI( | 22.7 | 40 | 13 (32.5 %) | 7 |
| Hunter, C. L. et al (2002) (84) | USA | Random Sampling (CS) | Active Duty | The Patient Health Questionnaire (PHQ) (the self-report version of the PRIME-MD) | 54.15 | 337 | 19 (5.6 %) | 7 |
| Karel, M. J. et al (2002) (85) | USA | Random Sampling (Survey Study) | Men Veterans | The Geriatric Depression Scale (GDS)- 15 item Hamilton Depression Rating Scale (HDRS)-24 item | 69.7 | 967 | 236 (24.4 %) | 7 |
| Kilbourne, A. M. et al (2002) (86) | USA | Random Sampling (CS) | Veterans with HIV infection | The 10-item Centers for Epidemiologic Studies Depression Scale (CES-D) | 49 | 881 | 405 (46 %) | 7 |
| Lehman, C. L. et al (2002) (87) | USA | Convenience Sampling (CS) | Veterans with Hepatitis C | The Beck Depression Inventory (BDI) | 49 | 120 | 53 (44.2%) | 6 |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|---------------------------------|------------------|-----------------------------|------------|-------------|-------------------------------|-----------|
| Muir, A. J. et al (2002)(88) | USA | Convenience Sampling (CS) | Veterans with Hepatitis C | The Center for Epidemiological Studies Depression (CES-D) scale | 47.3 | 100 | 12 (12%) | 6 |
| Nguyen, H. A. et al (2002) (89) | USA | Convenience Sampling (CS) | Veterans with Hepatitis C | Clinical Symptoms (Interviews) | 46.5 | 118 | 73 (62 %) | 6 |
| Black, D. W. et al (2004) (90) | USA | Convenience Sampling (CS) | Veterans | Clinical Symptoms (Interviews) | 39.3 | 602 | 192 (32 %) | 6 |
| Gerson, S. et al (2004) (91) | USA | Convenience Sampling (CS) | Elderly veterans (Male) | Mental Health Inventory (MHI) | 69.6 | 839 | 273 (32.5 %) | 8 |
| Rowan, P. J. et al (2004) (92) | USA | Convenience Sampling (CS) | Veterans with Hepatitis C | The Zung Self-report Depression Scale (SDS) | 51 | 580 | 93 (16 %) | 7 |
| Smith, T. C. et al (2004)(93) | USA | Random Sampling (CS) | US Military | The PRIME-MD Patient Health Questionnaire (PHQ) | 55 | 8893 | 1642 (18.5 %) | 8 |
| Vafae, B.et al (2004)(94) | Iran | Convenience Sampling (CS) | Disabled veterans male | The Zung Self-report Depression Scale (SDS) | 38 | 100 | 71 (71%) | 5 |
| Forman-Hoffman, V. L. et al (2005) (95) | USA | Convenience Sampling (CS) | Veterans | Structured Clinical Interview for DSM Disorders (SCID-IV) | 39.1 | 602 | 85 (14.11 %) | 6 |
| Goulet, J. L. et al (2005) (96) | USA | Convenience Sampling (Re) | Veterans with HIV | - | 47.1 | 20627 | 5776 (28 %) | 7 |
| | | | Veterans with Hepatitis C | - | 46.9 | 4489 | 1975 (44 %) | |
| Rowan, P. J. et al (2005) (97) | USA | Convenience Sampling (CS) | Veterans with Hepatitis C | The Beck Depression Inventory (BDI) | 52 | 62 | 6 (10 %) | 5 |
| Williams, R. M. et al (2005)(98) | USA | Convenience Sampling (CS) | Veterans with Multiple sclerosis | The Beck Depression Inventory (BDI) | 55.1 | 451 | 100 (22.2 %) | 7 |
| Xiong, H. et al (2005) (99) | China | Random Sampling (CS) | Young adult males during their 8 week field military training | The Zung Self-report Depression Scale (SDS) | 20 | 1107 | 279 (25.2 %) | 6 |
| Grieger, T. A. et al (2006) (100) | USA | Convenience Sampling (CS) | U.S. soldiers were injured in combat | The nine-item Patient Health Questionnaire depression scale | 26.94 | 301 | 28 (9.3 %) | 5 |
| Hoge, C. W. et al (2006) (101) | USA | Random Sampling (CS) | Army soldiers and Marines | The PRIME-MD Patient Health Questionnaire (PHQ) | 31.2 | 303905 | 15930 (5.24 %) | 8 |
| Authors (Years) | Country   | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|-----------|----------------------------------|------------------|-----------------------------|------------|-------------|-----------------------------|-----------|
| Kress, A. M. et al (2006) (102) | USA       | Random Sampling (CS)             | U.S. Military personnel | Burnam Screen               | -          | 4227        | 844 (20 %)                 | 8         |
| Pflanz, S. E. et al (2006) (103) | USA       | Convenience Sampling (CS)        | Military Personnel | Depression Checklist         | 28.7       | 780         | 141 (18 %)                 | 7         |
| Dove, M. B. et al (2007) (104) | USA       | Convenience Sampling (CS)        | Women Entering a Military Substance Use Disorder | Depression Checklist | -          | 86          | 67 (78 %)                  | 5         |
| Kolkow, T. T. et al (2007) (105) | USA       | Convenience Sampling (CS)        | Army soldiers     | The PRIME-MD Patient Health Questionnaire (PHQ) | 34.30      | 100         | 5 (5 %)                    | 5         |
| Warner, C. M. et al (2007) (106) | USA       | Convenience Sampling (CS)        | Military Personnel | The PRIME-MD Patient Health Questionnaire (PHQ) | 20.9       | 1090        | 173 (15.9 %)               | 6         | Male 20.9 955 143 (15 %)  |
| Hoge, C. W. et al (2008) (107) | USA       | Convenience Sampling (CS)        | Army individual   | The PRIME-MD Patient Health Questionnaire (PHQ) | -          | 1885        | 275 (15 %)                 | 6         | Marine individual 775 114 (14.7 %)  |
| Iversen, A. C. et al (2009) (108) | UK        | Random Sampling (CS)             | UK military personnel in service at the time of the 2003 Iraq War | The PRIME-MD Patient Health Questionnaire (PHQ) | 35         | 821         | 223 (27.2 %)               | 8         |
| Kline, A. et al (2009)(109) | USA       | Convenience Sampling (CS)        | Vietnam veterans with Substance Use Disorder | SCID DSM-IV Diagnoses | 55.20      | 82          | 39 (47.9 %)                | 8         | Post-Vietnam veterans with Substance Use Disorder 46.76 236 131 (55.4 %)  |
| Rehn, L. M. et al (2009) (110) | Finland   | Convenience Sampling (CS)        | Male Finnish military conscripts | The Beck Depression Inventory (BDI)  | 20         | 126         | 4 (3.2 %)                  | 6         |
| Rukskul, I. et al (2009) (111) | Thailand  | Convenience Sampling (CS)        | Thai army personnel | Clinical Symptoms (Interviews) | 45         | 1729        | 186 (10.75 %)              | 5         |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|---------------------------------|-----------------|-------------------------------|------------|-------------|-------------------------------|-----------|
| Rukskul, I. (2010)(112) | Thailand | Conveniee Sampling (CS) | Thai army personnel | Clinical Symptoms (Interviews) | 45 | 213 | 7 (3.3 %) | 5 |
| Fikretoglu, D. et al (2010) (113) | Canada | Conveniee Sampling (CS) | Canadian Community Health Survey-Canadian Forces Supplement (CCHS-CF) | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 8441 | 1257 (14.9 %) | 8 |
| Haskell, S. G. et al (2010) (114) | USA | Conveniee Sampling (CS) | War Veterans of Iraq and Afghanistan | Clinical Symptoms (Interviews) | 32 | Total (1229) | 472 (38.4 %) | 7 |
| | | | | | | Male (1032) | 380 (36.8 %) | |
| | | | | | 30 Female (197) | 92 (46.7 %) | |
| Luxton, D. D. et al (2010) (115) | USA | Conveniee Sampling (CS) | Active duty Soldiers between March 2006 and July 2009. | The PRIME-MD Patient Health Questionnaire (PHQ) | 27.37 | Total (6943) | 704 (10.1 %) | 7 |
| | | | | | Male (6427) | 646 (10.0 %) | |
| | | | | | Female (516) | 58 (46.7 %) | |
| Maguen, S. et al (2010) (116) | USA | Conveniee Sampling (CS) | Iraq and Afghanistan Veterans Enrolled in Veterans Affairs Health Care | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 31.21 | Total (329049) | 57051 (17.33 %) | 8 |
| | | | | | Male (288348) | 47876 (17 %) | |
| | | | | | 29.41 Female (40701) | 9175 (23 %) | |
| Stecker, T. et al (2010) (117) | Lebanon | Conveniee Sampling (CS) | Iraq/Afghanistan veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 34.4 | 293861 | 36900 (12.5 %) | 6 |
| | | | | | Iraq/Afghanistan Veterans with Alcohol Use Disorder | 118332 | 4568 (3.8 %) | |
| Burnett-Zeigler, I. et al (2011) (118) | USA | Random Sampling (CS) | Afghanistan and Iraq Veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 362 | 64 (17.6 %) | 7 |
| | | | | | Iraq/Afghanistan Veterans with Alcohol Use Disorder | 200 | 72 (36 %) | |
| Erbes, C. R. et al (2011) (119) | USA | Conveniee Sampling (CS) | National Guard/Reserve veterans returning from Iraq | The Beck Depression Inventory (BDI) | 31.60 | 617 | 83 (13.5 %) | 7 |
| Guerra, V. S. et al (2011) (120) | USA | Conveniee Sampling (CS) | Veterans in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) | The Beck Depression Inventory (BDI) | 38.3 | 393 | 88 (22.4 %) | 8 |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|---------------------------------|------------------|----------------------------|------------|-------------|-----------------------------|-----------|
| Jakupcak, M. et al (2011) (121) | USA | Convenience Sampling (CS) | Iraq and Afghanistan War Veterans in the U.S | The PRIME-MD Patient Health Questionnaire (PHQ) | 31 | 336 | 126 (37.5 %) | 7 |
| Kehle, S. M. et al (2011) (122) | USA | Convenience Sampling (CS) | Soldiers from a National Guard Brigade Combat Team (BCT) | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 31.30 | Total (348) | 51 (15 %) | 7 |
| Garber, B. G. et al (2012) (123) | Canada | Convenience Sampling (CS) | Canadian Forces Members While on Deployment to Afghanistan | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 1572 | 73 (4.7 %) | 5 |
| Maguen, S. et al (2012) (124) | USA | Convenience Sampling (Re) | Iraq and Afghanistan Veterans | The Diagnostic and Statistical Manual-Fourth Edition (DSM-IV) | 45 | Total (74493) | 41424 (56 %) | 7 |
| Vasterling, J. J. et al (2012)(125) | USA | Convenience Sampling (CS) | Iraq-deployed US Army soldiers | The Center for Epidemiological Studies Depression Scale (CES-D) | 25.1 | 760 | 238 (31.3 %) | 7 |
| Cohen, S. I. et al (2013) (126) | USA | Convenience Sampling (CS) | US military veterans returning from Iraq and Afghanistan | The Diagnostic and Statistical Manual-Fourth Edition (DSM-IV) | - | 93 | 44 (47.3 %) | 6 |
| Harbertson, J. et al (2013)(127) | USA | Convenience Sampling (CS) | Male Rwanda Defense Forces military personnel | The Center for Epidemiological Studies Depression Scale (CES-D) | 30.9 | 1238 | 232 (22.1 %) | 7 |
| Marshall, B. D. et al (2013)(128) | USA | Convenience Sampling (CS) | Ohio Army National Guard Soldiers | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 2117 | 128 (6 %) | 7 |
| Morrow, C. E. et al (2013) (129) | USA | Convenience Sampling (CS) | U.S. Air Force | The PRIME-MD Patient Health Questionnaire (PHQ) | 30.35 | 194 | 3 (1.6 %) | 5 |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|----------------------------------|------------------|------------------------------|------------|-------------|-------------------------------|-----------|
| Swinkels, C. M. et al (2013)(130) | UK | Convenience Sampling (CS) | U.S. Afghanistan/Iraq Veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 37.40 | 1640 | 308 (18.8 %) | 6 |
| Chapman, P. L. et al (2014)(131) | USA | Convenience Sampling (CS) | U.S. Army Combat Medics | The PRIME-MD Patient Health Questionnaire (PHQ) | 43.54 | 543 | 73 (13.4 %) | 6 |
| Clarke-Walper, K. et al (2014) (132) | USA | Convenience Sampling (CS) | Soldiers who returned from Iraq or Afghanistan | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 7849 | 611 (8.1 %) | 7 |
| - | | | Alcohol use | | | 2328 | 304 (13.1 %) | |
| Curry, J. F. et al (2014) (133) | USA | Convenience Sampling (CS) | Veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 37.48 | Total (1700) | 652 (38.4 %) | 7 |
| - | | | | | | Male (1354) | 491 (36.3 %) | |
| - | | | | | | Female (346) | 161 (46.5 %) | |
| - | | | | | | 623 | 72 (11.6 %) | |
| - | | | | | | 154 | 7 (4.5 %) | |
| Denneson, L. M. et al (2014)(134) | USA | Convenience Sampling (CS) | Iraq and Afghanistan Veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 465 | 237 (51 %) | 7 |
| Don Richardson, J. et al (2014)(135) | Canada | Convenience Sampling (CS) | Canadian Forces members and veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 404 | 316 (78.2 %) | 7 |
| Garber, B. G. et al (2014) (136) | Canada | Random Sampling (CS) | Canadian armed forces personnel | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 16153 | 593 (3.67 %) | 8 |
| Heltemes, K. J. et al (2014)(137) | USA | Random Sampling (CS) | Injured veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 22.5 | 812 | 146 (18 %) | 6 |
| Lehavot, K. et al (2014) (138) | USA | Random Sampling (CS) | Sexual Minority and Heterosexual Women Veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | 48 | 697 | 260 (37.3 %) | 7 |
| Authors (Years) | Country      | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|--------------|---------------------------------|------------------|-----------------------------|------------|-------------|-------------------------------|-----------|
| Ramsawh, H. J. et al (2014) (139) | USA          | Convenience Sampling (CS)        | Active Duty Military Personnel | 10-item Center for Epidemiologic Studies Depression Scale | 35         | 5461        | 1914 (35 %)                   | 8         |
| Bin Zubair, U. et al (2015) (140) | Pakistan    | Random Sampling (CS)             | All military recruits were men and above the age of 17 years. | The Beck Depression Inventory (BDI) | 20         | 313         | 159 (50.7 %)                  | 7         |
| Cleveland, S. D. et al (2015) (141) | USA          | Conveience Sampling (CS)         | Veterans and Civilian College Students | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | -          | 26969       | 7982 (30.17 %)                | 8         |
| Foote, C. E. et al (2015) (142) | USA          | Random Sampling (CS)             | Vietnam veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | -          | 247         | 44 (17.8 %)                   | 7         |
| Hamilton, A. B. et al (2015) (143) | USA          | Random Sampling (CS)             | Employed Women Veterans | The five-question Mental Health Inventory (MHI-5) | -          | 1410        | 120 (4.1 %)                   | 7         |
| Hoerster, K. D. et al (2015) (144) | USA          | Random Sampling (CS)             | Iraq and Afghanistan veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | 31.3       | 332         | 53 (16.3 %)                   | 7         |
| Kim, N. Y. et al (2015) (145) | USA          | Convenience Sampling (CS)        | Korean Soldiers | Scale for suicide ideation (SSI), The Beck Depression Inventory (BDI) | 21.3       | 414         | 21 (5 %)                      | 6         |
| Lundin, A. et al (2015) (146) | Sweden       | Random Sampling (CS)             | Vietnam veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | -          | 4251        | 1263 (29.7 %)                 | 7         |
| McGuire, A. et al (2015) (147) | UK           | Random Sampling (CS)             | Australian Defense Force (ADF men) | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 50         | 4091        | 454(11 %)                     | 7         |
| Mysliwiec, V. et al (2015) (148) | USA          | Convenience Sampling (CS)        | U.S. Military Personnel | Quick Inventory of Depressive Symptomatology (QIDS) | 36.2       | 58          | 30 (51.7 %)                   | 7         |
| Nasioudis, D. et al (2015) (149) | Greece       | Random Sampling (CS)             | Greek military medicine cadets | The Zung Self-report Depression Scale (SDS) | 19.84      | Total (146) | 57 (39 %)                     | 7         |
|                         |              |                                 |                  |                             |            | Male (91)    | 36 (39.5 %)                   |           |
|                         |              |                                 |                  |                             |            | Female (55)  | 21 (38.2 %)                   |           |
| Authors (Years) | Country     | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|-------------|----------------------------------|------------------|------------------------------|------------|-------------|-------------------------------|-----------|
| Vanderploeg, R. D. et al (2015) (150) | USA         | Convenience Sampling (CS)         | Florida National Guard Members | The PRIME-MD Patient Health Questionnaire (PHQ) | -          | 3098        | 63 (2 %)                      | 7         |
| Fink, D. S. et al (2016) (151)        | USA         | Convenience Sampling (CS)         | U.S. Army National Guard soldiers | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 44         | 671         | 154 (23 %)                    | 8         |
| Forbes, D. et al (2016) (152)         | Australia   | Convenience Sampling (CS)         | Australian peacekeepers | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 46.5       | 2050        | 201 (9.8 %)                   | 8         |
| Guloglu, B. et al (2016) (153)        | Turkey      | Convenience Sampling (CS)         | Turkish combat-injured non-professional veterans | The Brief Symptom Inventory (BSI) | 40         | 336         | 55 (16.4 %)                   | 7         |
| Hardos, J. E. et al (2016) (154)      | USA         | Convenience Sampling (CS)         | Aircraft Maintenance Workers | The PRIME-MD Patient Health Questionnaire (PHQ) | 29         | 4801        | 1042 (21.7 %)                 | 7         |
| Herberman Mash, H. B. et al (2016) (155) | USA         | Convenience Sampling (CS)         | U.S. Army soldiers with alcohol use | The 10-item Center for Epidemiologic Studies Depression Scale (CES-D) | -          | 3813        | 1368 (35.8 %)                 | 8         |
| Monteith, L. L. et al (2016)(156)     | USA         | Convenience Sampling (CS)         | Veterans | Beck Scale for Suicide Ideation (BSS) | 49.6       | Total (354)  | 169 (47.7 %)                  | 8         |
|                                             |             |                                  |                  | Male (310)                  | 146 (47.1 %) |             |                               |           |
|                                             |             |                                  |                  | Female (44)                 | 32 (52.3 %)  |             |                               |           |
| Phillips, K. M. et al (2016) (157)     | USA         | Convenience Sampling (CS)         | Iraq- and Afghanistan-era Veterans | 20-item, self-report Center for Epidemiological Studies Depression Scale (CES-D) | 35.1       | 359         | 108 (30 %)                    | 6         |
| Zamorski, M. A. et al (2016)(158)      | Canada      | Convenience Sampling (CS)         | Canadian Armed Forces | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | -          | 5120        | 410 (8 %)                     | 7         |
| Boakye, E. A. et al (2017) (159)       | USA         | Random Sampling (CS)              | Veterans with alcohol use | Self-Report | 40         | 144         | 48 (33.3 %)                   | 7         |
|                                             |             |                                  |                  | 75                          | 24 (32 %)   |             |                               |           |
| Cohen, G. H. et al (2017) (160)         | USA         | Convenience Sampling (CS)         | Army National Guard Soldiers | The PRIME-MD Patient Health | -          | 1582        | 164 (10.3 %)                  | 8         |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|---------------------------------|------------------|------------------------------|------------|-------------|-------------------------------|-----------|
| Gradus, J. L. et al (2017) (161) | USA | Random Sampling (CS) | Veterans of the Iraq and Afghanistan Wars | 20-item, self-report Center for Epidemiological Studies Depression Scale (CES-D), The 4-item Suicidal Behaviors Questionnaire-Short Form (SBQ-SF) | 34 | Total (2244) | 712 (31.7 %) | 7 |
| | | | | | | Male (1062) | 314 (29.5%) | |
| | | | | | Female (1099) | 398 (36.3%) | |
| Packnett, E. R. et al (2017)(162) | USA | Convenience Sampling (CS) | Army Navy Marine Corps Air Force | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 34487 | 1777 (5.1%) | 8 |
| | | | | | | 6602 | 263 (4 %) | |
| | | | | | | 8428 | 113 (1.3%) | |
| | | | | | | 9510 | 729 (7.6 %) | |
| Weeks, M. et al (2017) (163) | Canada | Convenience Sampling (CS) | Canadian Military and Civilian Populations | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 35 | 6696 | 536 (8 %) | 8 |
| Bartlett, B. A. et al (2018) (164) | USA | Convenience Sampling (CS) | Military veterans | 20-item, self-report Center for Epidemiological Studies Depression Scale (CES-D) | 38.40 | 910 | 75 (9.8 %) | 6 |
| Blakey, S. M. et al (2018) (165) | USA | Convenience Sampling (CS) | U.S. veterans, active duty personnel, and National Guard and Reserve members | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 37.8 | 667 | 169 (25.3%) | 7 |
| Boulos, D. et al (2018) | Canada | Random Sampling (CS) | Regular Force personnel | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 3385 | 129 (3.8 %) | 7 |
| | | | Reserve Force personnel | | | 1469 | 55 (3.7 %) | |
| Dillon, K. H. et al (2018) (167) | USA | Convenience Sampling (CS) | Iraq/Afghanistan-era veterans | The Beck Scale for Suicide Ideation (BSS), The Structured Clinical Interview for DSM-IV-TR (SCID) | - | 3238 | 1315 (40.6%) | 7 |
| Don Richardson, J. et al (2018)(168) | Canada | Convenience Sampling (CS) | Canadian Armed Forces members and veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | 44.6 | 522 | 413 (79.1 %) | 7 |
| Authors (Years)       | Country | Type of Sampling (Type of Study) | Study Population                        | Depression Assessment Method                                      | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------------|---------|---------------------------------|-----------------------------------------|------------------------------------------------------------------|------------|-------------|-----------------------------|-----------|
| Elbogen, E. B. et al (2018) (169) | USA     | Convenience Sampling (CS)        | Iraq/Afghanistan-era veterans           | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 34.9       | 1172        | 375 (32 %)                  | 6         |
| Hourani, L. L. et al (2018) (170) | USA     | Convenience Sampling (CS)        | Active duty military personnel          | The PRIME-MD Patient Health Questionnaire (PHQ), Checklist        | -          | 947         | 115 (15.4 %)                | 7         |
| Kizilhan, J. I. et al (2018) (171) | Iraq    | Convenience Sampling (CS)        | Child soldiers                          | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 12.6       | 81          | 37 (45.6 %)                 | 6         |
| McDonald, S. D. et al (2018) (172) | USA     | Convenience Sampling (CS)        | U.S. Department of Veterans Affairs outpatients | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 58.1       | 280         | 53 (19 %)                  | 7         |
| Stefanovics, E. A. et al (2018) (173) | USA     | Convenience Sampling (CS)        | US Veterans                             | The Patient Health Questionnaire-4                               | 59         | 3122        | 209 (6.7 %)                 | 7         |
| Vun, E. et al (2018) (174) | Canada  | Convenience Sampling (CS)        | Canadian Armed Forces active personnel  | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 35.4       | 6696        | 517 (8 %)                  | 8         |
| Waitzkin, H. et al (2018) (175) | USA     | Convenience Sampling (CS)        | Military Personnel                      | The PRIME-MD Patient Health Questionnaire (PHQ)                  | -          | 198         | 143 (72 %)                 | 7         |
| Byrne, S. P. et al (2019) (176) | USA     | Convenience Sampling (CS)        | U.S. military veterans                  | The PRIME-MD Patient Health Questionnaire (PHQ)                  | 53.4       | 158         | 62 (34.7 %)                | 7         |
| Carney, B. et al (2019) (177) | USA     | Random Sampling (CS)             | US Military population with HIV infection | 20-item, self-report Center for Epidemiological Studies Depression Scale (CES-D) | 32         | 662         | 114 (17.2 %)               | 8         |
| Jones, N. et al (2019) (178) | UK      | Random Sampling (CS)             | UK Armed Forces                         | The PRIME-MD Patient Health Questionnaire (PHQ)                  | -          | Total (1448) | 110 (7.6 %)                | 6         |
|                       |         |                                 |                                         |                                                          | Male (1229) | 93 (7.7 %)  |                             |           |
|                       |         |                                 |                                         |                                                          | Female (219) | 17 (7.9 %)  |                             |           |
| Lucas, C. L. et al (2019) (179) | USA     | Convenience Sampling (CS)        | Military Personnel                      | The PRIME-MD Patient Health Questionnaire                       | -          | Total (1980) | 660 (37.9 %)               | 7         |
|                       |         |                                 |                                         |                                                          | Male (1665) | 530 (36.2 %) |                             |           |
| Authors  (Years)          | Country | Type of Sampling (Type of Study) | Study Population | PHQ Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|--------------------------|---------|---------------------------------|------------------|----------------------------------|------------|-------------|-----------------------------|-----------|
| Nichter, B. et al (2019) (180) | USA     | Random Sampling (CS)            | U.S. veteran population | The Patient Health Questionnaire-4 (PHQ-4), The Patient Health Questionnaire-9 (PHQ-9) | 60.3       | 2732        | 201 (7.3 %)                | 9         |
| Start, A. R. et al (2019) (181) | USA     | Convenience Sampling (CS)       | Military Personnel | The Patient Health Questionnaire-9 (PHQ-9) | -          | 944         | 72 (7.6 %)                 | 7         |
| Blosnich, J. R. et al (2020)(182) | USA     | Random Sampling (CS)            | Military Veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | -          | 293872      | 45391 (15.4 %)             | 9         |
| Forys-Donahue, K. L. et al (2020)(183) | USA     | Random Sampling (CS)            | US Army population | The Patient Health Questionnaire-9 (PHQ-9) | -          | 7043        | 774 (11%)                  | 6         |
| Gjerstad, C. L. et al (2020)(184) | Norway  | Convenience Sampling (CS)       | Norwegian Peacekeepers | The Hospital Anxiety and Depression Scale (HADS) | 30         | 10450       | 417 (4 %)                  | 8         |
| Groll, D. L. et al (2020) (185) | Canada  | Convenience Sampling (CS)       | Canadian military persons | The Patient Health Questionnaire-9 (PHQ-9) | -          | 477         | 61 (12.8 %)                | 8         |
| Gross, G. M. et al (2020) (186) | USA     | Random Sampling (CS)            | U.S. veteran population | The Patient Health Questionnaire-9 (PHQ-9) | 35         | Total (650)  | 306 (47 %)                | 7         |
| Shim, E. J. et al (2020) (187) | Korea   | Random Sampling (CS)            | Korean military population | The Mini International Neuropsychiatric Interview Plus (MINI-Plus), The Patient Health Questionnaire-9 (PHQ-9) | 50.6       | 1937        | 162 (8.4 %)                | 8         |
| Smigelsky, M. A. et al (2020)(188) | USA     | Convenience Sampling (CS)       | U.S. military population | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 37.6       | 1002        | 210 (21 %)                 | 6         |
| Smith, L. M. et al (2020) (189) | USA     | Convenience Sampling (CS)       | U.S. Air Force Basic Military Training | The Patient Health Questionnaire-9 (PHQ-9) | -          | 85          | 20 (23.5 %)                | 5         |
| Stefanovics, E. A. et al (2020)(190) | USA     | Convenience Sampling (CS)       | U.S. Military Veterans | The Mini International Neuropsychiatric Interview (MINI), The Patient Health Questionnaire-9 (PHQ-9) | 55         | 1308        | 340 (30 %)                 | 5         |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Depression (%) | NOS Score |
|----------------|---------|----------------------------------|------------------|------------------------------|------------|------------|-----------------------------|-----------|
| Taillieu, T. L. et al (2020) (191) | Canada | Convenience Sampling (CS) | Canadian Armed Forces | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 6447 | 1006 (15.6%) | 5 |
| Wang, J. et al (2020) (192) | USA | Convenience Sampling (CS) | U.S. Reserve and National Guard Personnel | The Patient Health Questionnaire-9 (PHQ-9) | 34.4 | 3503 | 86 (2.5 %) | 6 |
| Ursano, R. J. et al (2020) (193) | USA | Convenience Sampling (CS) | US Army Soldiers During Deployment in Afghanistan | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 3957 | 173 (4.1 %) | 7 |
| Yeom, C. W. et al (2020) (194) | Korea | Convenience Sampling (CS) | Korean military personal | The Mini International Neuropsychiatric Interview Plus (MINI-Plus Suicidality module), The Patient Health Questionnaire-9 (PHQ-9) | 21.4 | 480 | 27 (5.6 %) | 6 |
Table 2
The study characteristics of included studies about suicide attempted and thought

| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample Size | Prevalence of Suicide (%) | NOS Score |
|-----------------|---------|---------------------------------|------------------|-------------------------------|------------|-------------|---------------------------|-----------|
| Helzer, J. E. et al (1976) (66) | USA | Random Sampling (CS) | Army men | Clinical Symptoms (Interviews) | - | 470 | NR | 42 (9 %) | 7 |
| Bohnker, B. et al (1992) (195) | USA | Random Sampling (CS) | Aircraft Carrier (men) | NR | - | 150 | 102 (68 %) | NR | 6 |
| Brown, G. R. et al (1993) (70) | USA | Random Sampling (CS) | Air Forces men with HIV | Structured Interview Guide for the Hamilton Anxiety and Depression Scales (SIGH-AD) | 35 | 442 | 24 (5.4 %) | NR | 8 |
| Lish, J. D. et al (1996) (74) | USA | Random Sampling (CS) | Army men and women | Brief self-report questionnaire (SCREENER) | 21.2 | 669 | NR | 51 (7.62 %) | 7 |
| Benda, B. B. (2003) (196) | USA | Convenience Sampling (CS) | Veterans Who Abuse Substances | Multi-Problem Screening Inventory (MPSI) | 50.3 | 600 | 240 (40 %) | NR | 184 (30.7 %) | 7 |
| Ritchie, E. C. et al (2003) (197) | USA | Convenience Sampling (CS) | Men and Women in the Navy and Marine Corps | Multi-Problem Screening Inventory (MPSI) | - | 43 | 100 | 54 (54 %) | NR | 5 |
| Benda, B. B. et al (2005) (198) | USA | Convenience Sampling (CS) | Veterans Who Abuse Substances | The Multi-Problem Screening Inventory (MPSI) | 40.3 | 625 | 197 (31.5 %) | 291 (46.5 %) | 6 |
| Hoge, C. W. et al (2006) (101) | USA | Random Sampling (CS) | Army soldiers and Marines | The PRIME-MD Patient Health Questionnaire (PHQ) | 31.2 | 303905 | NR | 3501 (1.15 %) | 8 |
| Dove, M. B. et al (2007) (104) | USA | Convenience Sampling (CS) | Women Entering a Military Substance Use Disorder | Depression Checklist | - | 86 | NR | 15 (17.4 %) | 5 |
| Kline, A. et al (2009) (109) | USA | Convenience Sampling (CS) | Vietnam veterans with Substance Use Disorder | SCID DSM-IV Diagnoses | 55.20 | 82 | 23 (27.8 %) | 5 (6.1 %) | 8 |
| | | | Post-Vietnam veterans with Substance Use Disorder | | 46.76 | 236 | 63 (26.8 %) | 16 (6.8 %) | |
| | | | Persian Gulf veterans with Substance Use Disorder | | 34 | 55 | 9 (15.4 %) | 5 (9.1 %) | |
| Rehn, L. M. et al (2009) (110) | Finland | Convenience Sampling (CS) | Male Finnish military conscripts | The Beck Depression Inventory (BDI) | 20 | 126 | NR | 9 (7.1 %) | 6 |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Suicide Attempts (%) | Prevalence of Suicide Thoughts (%) | NOS Score |
|----------------|---------|---------------------------------|------------------|-------------------------------|------------|-------------|------------------------------------|----------------------------------|-----------|
| Belik, S. L. et al (2010)(199) | Canada | Convenience Sampling (CS) | The Canadian Forces | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | -           | 37129       | 236 (0.8 %)                         | 1613 (4.34 %)                    | 8         |
| Guerra, V. S. et al (2011)(120) | USA | Convenience Sampling (CS) | Veterans in Operations Enduring Freedom and Iraqi Freedom (OEF/OIF) | The Beck Depression Inventory (BDI) Beck Scale for Suicide Ideation Scale for Suicide Ideation-Adapted | 38.3       | 393         | 34 (8.7 %)                         | 45 (11.5 %)                     | 8         |
| Mansfield, A. J. et al (2011)(200) | USA | Convenience Sampling (CS) | Military Personnel | The Center for Epidemiological Studies Depression (CES-D) scale, Military Personnel (Navy) The PRIME-MD Patient Health Questionnaire (PHQ) | 28.1       | 3069        | NR                                | 215 (7 %)                        | 6         |
|  |  |  | Military Personnel (Navy)  |  |  | 31.8       | 1843        | 98 (5.3 %)                         |  |  |
|  |  |  | Military Personnel (Marine) |  |  | 25.8       | 1226        | 110 (9 %)                          |  |  |
| Maguen, S. et al (2012)(201) | USA | Convenience Sampling (CS) | Vietnam veterans | Checklist | 40         | 244         | 12 (4.9 %)                         | 40 (16.4 %)                      | 6         |
| Swinkels, C. M. et al (2013)(130) | UK | Convenience Sampling (CS) | U.S. Afghanistan/Iraq Veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 37.40      | 1640        | 132 (8 %)                          | NR                                | 6         |
| Bryan, C. J. et al (2013)(202) | USA | Convenience Sampling (CS) | Deployed Military Personnel | The 4-item Suicidal Behaviors Questionnaire–Revised (SBQ-R) | -          | 161         | NR                                | 35 (21.7 %)                       | 5         |
| Bryan, C. J. et al (2013)(203) | USA | Convenience Sampling (CS) | Deployed Military Personnel | The 4-item Suicidal Behaviors Questionnaire–Revised (SBQ-R) | -          | 158         | 3 (1.5 %)                         | 21 (13.1 %)                      | 5         |
| Bryan, C. J. et al (2013)(204) | USA | Convenience Sampling (CS) | Air Force Personnel | Beck Scale for Suicidal Ideation-Current (BSSI-C) | 25.9       | 273         | NR                                | 53 (19.4%)                       | 5         |
| Bryan, C. J. et al (2013)(205) | USA | Convenience Sampling (CS) | Deployed Military Personnel | The Self-Injurious Thoughts and Behaviors Interview (SITBI) | 34.2       | 69          | NR                                | 25 (36.2 %)                       | 5         |
| Blosnich, J. R. et al (2014)(206) | USA | Convenience Sampling (CS) | Deployed Military Personnel | Checklist | -          | 4250        | NR                                | 154 (3.3 %)                       | 5         |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Suicide Attempts | Prevalence of Suicide Thoughts | NOS Score |
|----------------|---------|---------------------------------|------------------|-----------------------------|------------|-------------|--------------------------------|-------------------------------|-----------|
| Bryan, C. J. et al (2014)(207) | USA | Convenience Sampling (CS) | Deployed Military Personnel | The Self-Injurious Thoughts and Behaviors Interview (SITBI) | 36.7 | 374 | 29 (7.8%) | 136 (36.4%) | 6 |
| Mash, H. B. et al (2014)(208) | USA | Convenience Sampling (CS) | US Army | Checklist | - | 4999 | NR | 303(6%) | 6 |
| Don Richardson, J. et al (2014) (135) | Canada | Convenience Sampling (CS) | Canadian Forces members and veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 404 | NR | 68 (16.8 %) | 7 |
| Ramsawh, H. J. et al (2014) (139) | USA | Convenience Sampling (CS) | Active Duty Military Personnel | 10-item Center for Epidemiologic Studies Depression Scale | 35 | 5461 | 346 (6.33 %) | NR | 8 |
| Bryan, C. J. et al (2015)(209) | USA | Convenience Sampling (CS) | Air Force personnel | The Suicidal Behaviors Questionnaire Revised (SBQ-R) | - | 168 | 2 (1.2 %) | 29 (17.3 %) | 7 |
| Cleveland, S. D. et al (2015) (141) | USA | Convenience Sampling (CS) | Veterans and Civilian College Students | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 26969 | 282 (1.07 %) | 1730 (6.54 %) | 8 |
| Kim, N. Y. et al (2015) (148) | USA | Convenience Sampling (CS) | Korean Soldiers | Scale for suicide ideation (SSI), The Beck Depression Inventory (BDI) | 21.3 | 414 | NR | 80 (19.3 %) | 6 |
| Ursano, R. J. et al (2015) (210) | USA | Convenience Sampling (CS) | Soldiers | The Columbia Suicidal Severity Rating Scale (C-SSRS) | 20 | 38237 | 536 (1.9 %) | 5353 (14 %) | 8 |
| Vanderploeg, R. D. et al (2015) (150) | USA | Convenience Sampling (CS) | Florida National Guard Members | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 3098 | NR | 130 (4.2 %) | 7 |
| Forbes, D. et al (2016)(152) | Australia | Convenience Sampling (CS) | Australian peacekeepers | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 46.5 | 2050 | 25 (1.2 %) | 275 (13.4 %) | 8 |
| Herberman Mash, H. B. et al (2016)(155) | USA | Convenience Sampling (CS) | U.S. Army soldiers | The 10-item Center for Epidemiologic Studies Depression Scale | - | 3813 | 230 (6 %) | NR | 8 |
| | | | U.S. Army soldiers with alcohol use | | | 1210 | 100 (8.3 %) | | | |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Suicide (%) | NOS Score |
|----------------|---------|---------------------------------|------------------|----------------------------|------------|-------------|---------------------------|-----------|
| Monteith, L. L. et al (2016) (156) | USA | Convenience Sampling (CS) | Veterans | Beck Scale for Suicide Ideation (BSS), Multidimensional Suicide Inventory-28 (MSI) Negative Affect scale | 49.6 | Total (354) | 92 (26.8 %) | NR | 8 |
| Cohen, G. H. et al (2017) (160) | USA | Convenience Sampling (CS) | Army National Guard Soldiers | The PRIME-MD Patient Health Questionnaire (PHQ), The PHQ-9 Item | - | 1582 | NR | 42 (2.6 %) | 8 |
| Gradus, J. L. et al (2017) (161) | USA | Random Sampling (CS) | Veterans of the Iraq and Afghanistan Wars | 20-item, self-report Center for Epidemiological Studies Depression Scale (CES-D), The 4-item Suicidal Behaviors Questionnaire-Short Form (SBQ-SF) | 34 | Total (2244) | NR | 370 (16.5 %) | 7 |
| Weeks, M. et al (2017)(163) | Canada | Convenience Sampling (CS) | Canadian Military and Civilian Populations | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 35 | 6696 | NR | 289 (4. %) | 8 |
| Bartlett, B. A. et al (2018) (164) | USA | Convenience Sampling (CS) | Military veterans | 20-item, self-report Center for Epidemiological Studies Depression Scale (CES-D) | 38.40 | 910 | 62 (7.5 %) | NR | 6 |
| Boulos, D. et al (2018)(166) | Canada | Random Sampling (CS) | Regular Force personnel | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 3385 | NR | 156 (4.6 %) | 7 |
| Dillon, K. H. et al (2018)(167) | USA | Convenience Sampling (CS) | Iraq/Afghanistan-era veterans | The Beck Scale for Suicide Ideation (BSS), The Structured Clinical Interview for DSM-IV-TR (SCID) | - | 3238 | 291 (9 %) | NR | 7 |
| Authors (Years) | Country | Type of Sampling (Type of Study) | Study Population | Depression Assessment Method | Age (Mean) | Sample size | Prevalence of Suicide Attempts | Prevalence of Suicide Thoughts | NOS Score |
|----------------|---------|----------------------------------|------------------|-----------------------------|------------|-------------|-------------------|------------------|-----------|
| Elbogen, E. B. et al (2018) (169) | USA | Convenience Sampling (CS) | Iraq/Afghanistan-era veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | 34.9 | 1172 | 87 (7.5 %) | NR | 6 |
| Hourani, L. L. et al (2018) (170) | USA | Convenience Sampling (CS) | Active duty military personnel | The PRIME-MD Patient Health Questionnaire (PHQ), Checklist | - | 947 | 16 (2.1 %) | 71 (9.2 %) | 7 |
| Kachadourian, L. K. et al (2018)(211) | USA | Convenience Sampling (CS) | Veterans | The Columbia-Suicide Severity Rating Scale (C-SSRS) | 43.9 | 93 | 19 (21.6 %) | NR | 6 |
| Kerr, K. et al (2018)(212) | Australia | Convenience Sampling (CS) | Australian veterans | Checklist | 54.6 | 229 | 54 (23.6 %) | NR | 6 |
| Waitzkin, H. et al (2018)(175) | USA | Convenience Sampling (CS) | Military Personnel | The PRIME-MD Patient Health Questionnaire (PHQ) | - | 198 | NR | 92 (48 %) | 7 |
| Byrne, S. P. et al (2019)(176) | USA | Convenience Sampling (CS) | U.S. military veterans | The PRIME-MD Patient Health Questionnaire (PHQ) | 53.4 | 158 | 40 (24.4 %) | 39 (30.2 %) | 7 |
| Nichter, B. et al (2019)(180) | USA | Random Sampling (CS) | U.S. veteran population | The Patient Health Questionnaire-4 (PHQ-4), The Patient Health Questionnaire-9 (PHQ-9) | 60.3 | 2732 | 134 (4.9 %) | 248 (9 %) | 9 |
| Start, A. R. et al (2019)(181) | USA | Convenience Sampling (CS) | Military Personnel | The Patient Health Questionnaire-9 (PHQ-9) | - | 944 | NR | 31 (3.3 %) | 7 |
| Blosnich, J. R. et al (2020) (182) | USA | Random Sampling (CS) | Military Veterans | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | - | 293872 | 1035 (0.3 %) | 2999 (1 %) | 9 |
| Cramer, R. J. et al (2020) (213) | USA | Random Sampling (CS) | Military Personnel | The Suicide Behaviors Questionnaire-Revised (SBQ-R) | - | 200 | 96 (48 %) | NR | 6 |
| Groll, D. L. et al (2020)(185) | Canada | Convenience Sampling (CS) | Canadian military persons | The Patient Health Questionnaire-9 (PHQ-9) | - | 477 | 19 (4 %) | 76 (16%) | 8 |
| Authors (Years) | Country   | Type of Sampling (Type of Study) | Study Population                             | Depression Assessment Method                                                                 | Age (Mean) | Sample size | Prevalence of Suicide (%) | NOS Score |
|----------------|-----------|---------------------------------|---------------------------------------------|---------------------------------------------------------------------------------------------|------------|-------------|---------------------------|-----------|
| Shim, E. J. et al (2020)(187) | Korea     | Random Sampling (CS)            | Korean military population                   | The Mini International Neuropsychiatric Interview Plus (MINI-Plus), The Patient Health Questionnaire-9 (PHQ-9) | 50.6       | 1937        | 87 (4.5 %)                | NR        |
| Smigelsky, M. A. et al (2020) (188) | USA       | Convenience Sampling (CS)       | U.S. military population                     | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV)                           | 37.6       | 1002        | 41 (4 %)                  | NR        |
| Stefanovics, E. A. et al (2020)(190) | USA       | Convenience Sampling (CS)       | U.S. Military Veterans                       | The Mini International Neuropsychiatric Interview (MINI), The Patient Health Questionnaire-9 (PHQ-9) | 55         | 1308        | 118 (9 %)                 | 165 (12.6 %) |
| Wang, J. et al (2020)(192) | USA       | Convenience Sampling (CS)       | U.S. Reserve and National Guard Personnel    | The Patient Health Questionnaire-9 (PHQ-9)                                                 | 34.4       | 3503        | NR                        | 101 (2.9 %) |
| Anestis, M. D. et al (2020) (214) | USA       | Convenience Sampling (CS)       | U.S. Military Veterans                       | The Suicide Behaviors Questionnaire-Revised (SBQ-R)                                         | 27.0       | 953         | NR                        | 105 (15.2 %) |
| Monteith, L. L. et al (2020) (215) | USA       | Convenience Sampling (CS)       | Female veterans                              | Checklist                                                                                    | 55.6       | 439         | 158(36 %)                 | 113(25.7%) |
| Ursano, R. J. et al (2020) (193) | USA       | Convenience Sampling (CS)       | US Army Soldiers During Deployment in Afghanistan | Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) | -          | 3957        | NR                        | 85 (2.1 %) |
| Yeom, C. W. et al (2020)(194) | Korea     | Convenience Sampling (CS)       | Korean military personal                     | The Mini International Neuropsychiatric Interview Plus (MINI-Plus Suicidality module), The Patient Health Questionnaire-9 (PHQ-9) | 21.4       | 480         | 22(4.5 %)                 | NR        |

Quantitative analysis

Prevalence of depression in the all military

Initially, the studies were divided into two groups: the active duty military community and the veteran's community in terms of the study population. Then, separate analyzes were performed for each of these communities and the prevalence of depression in each was meta-analyzed. Of the 133 final selected cross-sectional studies, 80 were in the veterans and 100 were in the active duty military personnel.
Prevalence of depression in the active duty military

In these studies, 1278837 employees of the active or serving military had been examined, of whom 273173 had depression. After combining the results of these studies, the overall pooled prevalence of depression in the active or in-service military was 23% with a confidence interval of 20 to 26%. The percentage of heterogeneity was 99.91% which was statistically significant (Table 3).
Table 3
The pooled estimate of prevalence of depression in active duty and veteran military

| Categories                        | No. of Studies (Sample Size) | Pooled Prevalence (% 95 CI) | Between studies heterogeneity assessment (%) | Between subgroups heterogeneity assessment (%) |
|-----------------------------------|------------------------------|----------------------------|---------------------------------------------|-----------------------------------------------|
|                                   |                              |                            | \( \hat{\rho} \) \( P_{\text{Heterogeneity}} \) \( Z \) \( Q \) \( P \)\( P_{\text{Heterogeneity}} \) | \( \hat{\rho} \) \( P_{\text{Heterogeneity}} \) \( Z \) \( Q \) \( P \)\( P_{\text{Heterogeneity}} \) |
| The prevalence of depression in active duty military |                              |                            |                                             |                                               |
| Total                             | 100 (1278837)                | 23 % (20–26 %)             | 87.91 %                                     | 0.018                                         |
|                                   |                              |                            | 27.74                                       | -                                             |
|                                   |                              |                            | 9.33                                         | 0.001                                         |
|                                   |                              |                            | 8.98                                         | 0.001                                         |
| Sampling Method                   |                              |                            |                                              |                                               |
| Convinces Sampling                | 67 (939796)                  | 21 % (18–25 %)             | 66.90 %                                     | 0.030                                         |
|                                   |                              |                            | 20.25                                       | 9.33                                          |
|                                   |                              |                            | 9.33                                         | 0.001                                         |
|                                   |                              |                            | 8.98                                         | 0.001                                         |
|                                   |                              |                            | 8.98                                         | 0.001                                         |
| Random Sampling                   | 33 (339041)                  | 26 % (19–32 %)             | 54.80 %                                     | 0.050                                         |
|                                   |                              |                            | 13.11                                       | -                                             |
|                                   |                              |                            | -                                            | -                                             |
|                                   |                              |                            | -                                            | -                                             |
| Type of Forces                    |                              |                            |                                              |                                               |
| Air Forces                        | 36 (995073)                  | 22 % (20–23 %)             | 83.93 %                                     | 0.040                                         |
|                                   |                              |                            | 5.59                                         | 8.98                                          |
|                                   |                              |                            | 0.02                                         |
|                                   |                              |                            | 0.001                                        |
|                                   |                              |                            | 0.001                                        |
| Armed Forces                      | 6 (775778)                   | 31 % (16–48 %)             | 89.45 %                                     | 0.0001                                        |
|                                   |                              |                            | 6.22                                         | -                                             |
| Marine Forces                     | 53 (201624)                  | 22 % (16–28 %)             | 90.86 %                                     | 0.005                                         |
| Military Forces                   |                              |                            | 12.41                                       | -                                             |
|                                   |                              |                            | -                                            | -                                             |
|                                   |                              |                            | -                                            | -                                             |
| Population                        | 90 (1152451)                 | 22 % (20–25 %)             | 99.87 %                                     | 0.0001                                        |
| Healthy Forces                    | 3 (113620)                   | 15 % (3–36 %)              | -                                            | -                                             |
|                                   |                              |                            | -                                            | -                                             |
| Forces with HIV/AIDS              | 5 (8303)                     | 29 % (13–47 %)             | 99.96 %                                     | 0.0001                                        |
|                                   |                              |                            | 5.70                                         | -                                             |
| Forces with Alcohol Use           | 2 (4463)                     | 37 % (36–39 %)             | -                                            | -                                             |
|                                   |                              |                            | -                                            | -                                             |
| Gender                            | 71 (1163273)                 | 22 % (20–25 %)             | 90.88 %                                     | 0.0001                                        |
| Total                             | 20 (110847)                  | 23 % (12–37 %)             | 91.83 %                                     | 0.0001                                        |
| Male                              | 9 (4717)                     | 25 % (13–40 %)             | 89.99 %                                     | 0.012                                         |
| Female                            |                              |                            | 6.15                                         | -                                             |
| Tools                             | 9 (38888)                    | 25 % (15–36 %)             | 65.75 %                                     | 0.054                                         |
|                                  |                              |                            | 5.88                                         | 5.09                                          |
|                                  |                              |                            | 0.001                                        |
|                                  |                              |                            | 0.001                                        |
|                                  | BDI Scale                    | 7 (15365)                  | 13 % (8–19 %)                               | 0.130                                         |
|                                  |                              |                            | 4.05                                         | -                                             |
|                                  | CES-D Scale                  | 13 (16980)                 | 25 % (17–35 %)                              | 0.060                                         |
|                                  |                              |                            | 10.22                                        | -                                             |
|                                  | Interviews                   | 36 (202430)                | 15 % (11–19 %)                              | 0.078                                         |
|                                  |                              |                            | 12.41                                        | -                                             |
|                                  | DSM-IV Scale                 | 1 (236)                    | 56 % (49–60 %)                              | -                                             |
|                                  | BSZ Scale                    | 1 (197)                    | 47 % (40–54 %)                              | -                                             |
|                                  | HAMD Scale                   | 1 (6943)                   | 10 % (9–11 %)                               | -                                             |
|                                  | HADS Scale                   | 24 (692087)                | 15 % (13–17 %)                              | 0.059                                         |
|                                  | PHQ Scale                    | 5 (304767)                 | 20 % (14–26 %)                              | 0.059                                         |
|                                  | SDS Scale                    | 78.62 %                    | -                                            | 72.99                                         |

Beck Depression Inventory (BDI), Center for Epidemiological Studies Depression (CES-D), Clinical Symptoms (Interviews), Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), The Brief Symptom Inventory (BSI), The Hamilton Depression Rating Scale (HAMD), The Hospital Anxiety and Depression Scale (HADS), The Patient Health Questionnaire (PHQ), The Zung Self-Report Depression Scale (SDS), Geriatric Depression Scale (GDS), Mental Health Inventory (MHI), Quick Inventory of Depressive Symptomatology (QIDS), Hamilton Depression Rating Scale (HDRS)-24 item,
| Categories                         | No. of Studies (Sample Size) | Pooled Prevalence (% 95 CI) | Between studies heterogeneity assessment (%) | Between subgroups heterogeneity assessment (%) |
|-----------------------------------|------------------------------|-----------------------------|---------------------------------------------|-----------------------------------------------|
|                                   |                              |                             | $\phi$ $P_{\text{Heterogenity}}$ $Z$ $Q$ $P_{\text{Heterogenity}}$ |
| The prevalence of depression in veteran military |                              |                             |                                             |                                              |
| Total                             | 80 (887982)                  | 20 % (18–22 %)              | 79.80 %                                     | 0.032                                         |
|                                  |                              |                             | 31.46 %                                     | -                                             |
|                                   |                              |                             |                                             | -                                             |
| Sampling Method                   | 55 (565979)                  | 19 % (16–21 %)              | 69.78 %                                     | 0.049                                         |
| Convinces Sampling                | 25 (322003)                  | 22 % (18–27 %)              | 58.26 %                                     | 0.054                                         |
| Random Sampling                   |                              |                             |                                             | 10.02                                         |
| Type of Forces                    |                              |                             |                                             | 17.25                                         |
| Air Forces                        |                              |                             |                                             | 2.12                                          |
| Armed Forces                      |                              |                             |                                             | 0.150                                         |
| Marine Forces                     |                              |                             |                                             | 0.034                                         |
| Military Forces                   |                              |                             |                                             | 9.83                                          |
| Population                        |                              |                             |                                             | 1.27                                          |
| Healthy Forces                    | 64 (856091)                  | 19 % (17–22 %)              | 99.09 %                                     | 0.0001                                        |
| Forces with HIV/AIDS              | 2 (1257)                     | 16 % (14–18 %)              | 91.33 %                                     | 0.0001                                        |
| Forces with Alcohol Use           | 4 (1780)                     | 29 % (21–37 %)              | 98.44 %                                     | 0.0001                                        |
| Forces with Substance Use         | 4 (4397)                     | 10 % (6–14 %)               | 74.50 %                                     | 0.001                                         |
| Forces with HCV                   | 6 (24457)                    | 29 % (17–43 %)              |                                             | 7.36                                          |
| Gender                            |                              |                             |                                             | 28.40                                         |
| Total                             |                              |                             |                                             | 0.001                                         |
| Male                              | 55 (237654)                  | 20 % (17–23 %)              | 90.88 %                                     | 0.0001                                        |
| Female                            | 15 (343584)                  | 21 % (13–31 %)              | 91.91 %                                     | 0.0001                                        |
|                                  | 10 (306744)                  | 20 % (14–26 %)              | 88.49 %                                     | 0.0001                                        |

Beck Depression Inventory (BDI), Center for Epidemiological Studies Depression (CES-D), Clinical Symptoms (Interviews), Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), The Brief Symptom Inventory (BSI), The Hamilton Depression Rating Scale (HAMD), The Hospital Anxiety and Depression Scale (HADS), The Patient Health Questionnaire (PHQ), The Zung Self-Report Depression Scale (SDS), Geriatric Depression Scale (GDS), Mental Health Inventory (MHI), Quick Inventory of Depressive Symptomatology (QIDS), Hamilton Depression Rating Scale (HDRS)-24 item,
The pooled prevalence of depression was 21% (% 95 CI; 18–25 %) in studies where the sampling method was the available one (convinces sampling). A total of 67 studies used this type of sampling method, which had examined a total of 939,796 active members, of whom 21,7487 had been considered depressed. In addition, 33 studies with a sample size of 339041 people had used the random sampling method to collect their samples. After combining these studies, the pooled prevalence of depression was estimated to be 26% (% 95 CI; 19–32 %) (Table 3).

In this meta-analysis, the pooled prevalence of depression in active duty military personnel was also calculated based on the location and the results were reported in Table 3. The results showed that the pooled prevalence of depression in active air, land, and naval forces was 20% (% 95 CI; 9–33 %), 22% (% 95 CI; 20–23 %), and 31% (% 95 CI; 16–48 %), respectively. In 53 cross-sectional studies, it had not been specified that in which military unit, the study population was serving and it had been mentioned as military forces in those studies, so, a group called military forces was formed, the sample size of which was equal to 201624 active military personnel of whom 65,158 people were depressed. The pooled prevalence of depression after a combination of these studies was 22% (% 95 CI; 16–28 %) (Table 3).

The pooled prevalence of depression in active militaries with HIV was 15% (% 95 CI; 3–36 %), in active militaries with substance use was 37% (% 95 CI; 36–39 %), in militaries using alcohol was equal to 29% (% 95 CI; 13–47 %) and finally in healthy and disease-free military members was equal to 22% (% 95 CI; 20–25 %) (Table 3).

The pooled prevalence of depression in the active military varied by gender. A total of 71 cross-sectional studies had not identified the gender of the study population while 20 and 9 studies had been performed on military men and women, respectively. In studies that had not specified gender, the sample size was 1163273 people, of whom 221910 individuals were depressed. The sample size in cross-sectional studies on military men and women was 110847 and 4717 people, respectively, of whom 50370 and 893 were depressed, respectively. The results of meta-analysis showed that the pooled prevalence of depression in male soldiers was equal to 23% (% 95 CI; 12–37 %) while in military women, it was equal to 25% (% 95 CI; 21–32 %) (Table 3).

36 cross-sectional studies had used the diagnostic and statistical manual of mental disorders-IV (DSM-IV), 24 studies had used the patient health questionnaire (PHQ), 13 studies had applied interviews using clinical criteria and symptoms, 5 studies had applied the Zung self-tool report depression scale (SDS), 9 studies had used the beck depression inventory (BDI) and 7 studies had used the center for epidemiological studies depression (CES-D) to diagnose depression in the active or in-service military. The overall prevalence of depression according to the diagnostic and statistical manual of mental disorders-IV (DSM-IV) was 15% (% 95 CI; 17–35 %), according to the patient health questionnaire (PHQ), it was 15% (% 95 CI; 13–17 %), And according to the Zung self-report depression scale (SDS), it was equal to 20% (% 95 CI; 14–26 %). Also, the overall pooled

| Categories | No. of Studies (Sample Size) | Pooled Prevalence (% 95 CI) | Between studies heterogeneity assessment (%) | Between subgroups heterogeneity assessment (%) |
|------------|-----------------------------|-----------------------------|---------------------------------------------|---------------------------------------------|
| Tools      | 7 (415692)                  | 14% (9–21%)                 | 55.15 %                                     | 22.16 %                                     |
| BDI Scale  | 11 (318802)                 | 18% (13–25%)                | 40.45 %                                     | 18% (13–25%)                               |
| CES-D Scale| 13 (50675)                  | 20% (11–31%)                | 78.99 %                                     | 20% (11–31%)                               |
| Interviews | 11 (64263)                  | 15% (9–22%)                 | 78.48 %                                     | 20% (9–22%)                                |
| DSM-IV Scale| 29 (28445)                 | 21% (17–25%)                | 78.48 %                                     | 20% (17–25%)                               |
| PHQ Scale  | 2 (1300)                    | 47% (44–50%)                | 52.04 %                                     | 49.1 %                                     |
| SDS Scale  | 1 (1032)                    | 37% (34–40%)                | 52.04 %                                     | 49.1 %                                     |
| GDS Scale  | 4 (3649)                    | 35% (15–59%)                | 52.04 %                                     | 49.1 %                                     |
| MHI Scale  | 1 (1002)                    | 21% (18–24%)                | 52.04 %                                     | 49.1 %                                     |
| QIDS Scale | 1 (3122)                    | 7% (6–8%)                   | 52.04 %                                     | 49.1 %                                     |
| HDRS Scale |                          |                             | 50.74 %                                     | 50.74 %                                     |

Beck Depression Inventory (BDI), Center for Epidemiological Studies Depression (CES-D), Clinical Symptoms (Interviews), Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV), The Brief Symptom Inventory (BSI), The Hospital Anxiety and Depression Scale (HADS), The Patient Health Questionnaire (PHQ), The Zung Self-Report Depression Scale (SDS), Geriatric Depression Scale (GDS), Mental Health Inventory (MHI), Quick Inventory of Depressive Symptomatology (QIDS), Hamilton Depression Rating Scale (HDRS)-24 item.
prevalence based on beck depression inventory (BDI) and the center for epidemiological studies depression (CES-D) was 25% (% 95 CI; 15–36 %) and 13% (% 95 CI; 8–19 %), respectively (Table 3).

Publication bias, and meta-regression in studies related to the active military

The results of the publication bias were shown in Fig. 2 for studies related to the active military. The results of the Eggers test showed that diffusion bias did not occur in calculating the prevalence of depression in the active military (B: 0.96, SE: 0.69, P: 0.167) (Fig. 2). In meta-regression analysis, the effect of military personnel age on prevalence was studied and analyzed. The results presented that age had a significant effect on the prevalence of depression in the active military and for every 1 year of age, depression increased by 0.04%. The results of heterogeneity evaluation demonstrated that 5 studies were the cause of heterogeneity in the meta-analysis of the depression prevalence in active military (Fig. 2).

Prevalence of depression in veterans

Regarding the prevalence of depression in veterans, 80 cross-sectional articles with a sample size of 887982 people were reviewed, of whom 822967 people were depressed. After combining the results of these studies, the overall pooled prevalence of depression in veterans was 20% (% 95 CI; 18–22 %). The percentage of heterogeneity was 99.80% which was statistically significant (Table 3).

The results of the subgroup analysis showed that 55 studies had used the convinces sampling method and 25 studies had used the random sampling method to determine the prevalence of depression in veterans. The sample size in the studies that had used the convinces sampling method was equal to 565979 people. After combining their results, the pooled prevalence of depression was equal to 19% (% 95 CI; 16–21 %). Also, the sample size in studies that had used the random sampling method was equal to 32,2003 people. After combining their results, the pooled prevalence of depression in veterans was equal to 22% (% 95 CI; 18–27 %) (Table 3).

Regarding the military community of different divisions, the analysis showed that in the case of veterans, 68 studies had been conducted in the veterans’ community of the Army, and 12 studies had been conducted in the entire military (without separating the different divisions). There was no study in the Air Force or Navy. The sample size in military veterans was 583048 people and after combining these results, the pooled prevalence of depression was 19% (% 95 CI; 17–22 %) (Table 3).

The results of meta-analysis based on questionnaires and various measurement tools showed that heterogeneity of pooled prevalence was significantly reduced. In this section, 7 cross-sectional studies included in the meta-analysis using the beck depression inventory (BDI) questionnaire, 11 studies using the center for epidemiological studies depression (CES-D), 13 studies based on clinical criteria and interviews, 11 studies based on diagnostic and statistical manual of mental disorders-IV (DSM-IV), 29 studies based on the patient health questionnaire (PHQ), 2 studies based on the Zung self-report depression scale (SDS), 4 studies based on mental health inventory (MHI), 1 study based on Hamilton depression rating scale (HDRS), 1 study based on the quick inventory of depressive symptomatology (QIDS), and 1 study based on the geriatric depression scale (GDS) had examined depression in veterans. The results of the meta-analysis showed that the prevalence of depression according to the statistical manual of mental disorders-IV (DSM-IV), the patient health questionnaire (PHQ), and beck depression inventory (BDI) was 15% (% 95 CI; 9–22 %), 21% (% 95 CI; 17–25 %), and 14% (% 95 CI; 9–21 %), respectively (Table 3).

Publication bias, and meta-regression in studies related to veterans

The results of the publication bias were shown in Fig. 2 for studies related to veterans. The results of the Eggers test presented that bias occurred in calculating the prevalence of depression in veterans (B: 8.95, SE: 0.54, P: 0.001) (Fig. 2). In meta-regression analysis, the effect of military age on prevalence was examined and analyzed, which showed that age did not have a significant effect on the prevalence of depression in military veterans.

Prevalence of suicide in the military

The results of this study demonstrated that 49 studies related to the prevalence of suicidal ideation in the military and 42 studies related to the prevalence of suicide attempts in the military were included in the meta-analysis. The sample size in studies related to suicidal ideation was 759,374 people, of whom a total of 20,065 individuals had suicidal ideation. However, the sample size in studies related to suicide attempts was equal to 438,890 people, of whom 5471 people had attempted suicide. The results of meta-analysis showed that the pooled prevalence of suicidal ideation in the entire military was 11% (% 95 CI; 10–13 %) (Fig. 3). The pooled prevalence of suicide attempts in all military was equal to the prevalence of suicidal ideation 11% (% 95 CI; 9–13 %) (Fig. 4).

To accurately estimate the prevalence of suicidal ideation in the military and to find the source of heterogeneity in the study, the subgroup analysis was performed based on whether the military person was serving or a veteran at that time, the study sampling method (random or convinces), the military service location, the statistical population of the study in terms of the presence of various diseases or being healthy, gender, and finally the tools used to measure suicide ideation and attempts. The results were shown in Table 4. As can be seen from the results, the pooled prevalence of suicidal ideation in veterans was higher than that in active military (14% vs. 10%). Suicidal ideation was also higher in women than men (Table 4). The pooled prevalence of suicidal ideation was higher in the air force (19%) than that in the navy and the army (Table 4). In the military with substance use, the prevalence of suicidal ideation was 18% (% 95 CI; 7–33 %), which was higher than one in the military consuming alcohol with a prevalence of 9% (% 95 CI; 4–13 %) (Table 4). In studies that had used multi-problem screening inventory (MPSI) and the self-injurious thoughts
and behaviors interview (SITBI) to estimate suicidal ideation, the prevalence was 39% (95 CI; 36–41 %), and 36% (95 CI; 32–41 %), respectively, which was higher than those in studies that had used other tools to estimate the prevalence of suicidal ideation in the military (Table 4).
Table 4
The pooled estimate of prevalence of suicide in active duty and veteran military

| Categories                          | No. of Studies (Sample Size) | Pooled Prevalence (% 95 CI) | Between studies heterogeneity assessment (%) | Between subgroups heterogeneity assessment (%) |
|------------------------------------|------------------------------|-----------------------------|---------------------------------------------|----------------------------------------------|
|                                    |                              |                             | p_Heterogeneity | Z | Q | p_Heterogeneity |
| Military Statue                    | 31 (424253)                  | 10 % (7–13 %)               | 67.55 %        | 0.402 | 12.55 | 2.24 | 0.130 |
| Active Duty                        | 18 (335121)                  | 14 % (10–20 %)              | 69.77 %        | 0.329 | 9.59  |       |       |
| Veteran                            |                              |                             |                |       |       |       |       |
| Sampling Method                    |                              |                             |                |       |       |       |       |
| Convinces Sampling                 | 40 (151199)                  | 12 % (10–15 %)              | 57.23 %        | 0.170 | 20.37 | 15.76 | 0.001 |
| Random Sampling                    | 9 (608175)                   | 7 % (6–9 %)                 | 74.31 %        | 0.059 | 17.83 |       |       |
| Type of Forces                     |                              |                             |                |       |       |       |       |
| Air Forces                         | 23 (434677)                  | 8 % (5–11 %)                | 78.99 %        | 0.041 | 17.36 | 30.05 | 0.001 |
| Armed Forces                       | 2 (295715)                   | 1 % (1–2 %)                 | 88.68 %        | 0.025 | 9.57  |       |       |
| Marine Forces                      | 22 (28982)                   | 16 % (12–21 %)              | 93.86 %        | 0.0001 | 10.98 |       |       |
| Military Forces                    |                              |                             |                |       |       |       |       |
| Population                         | 42 (757597)                  | 11 % (9–13 %)               | 99.80 %        | 0.0001 | 20.07 | 1.74  | 0.420 |
| Healthy Forces                     | -                            | -                           | -              | -     | -     |       |       |
| Forces with HIV/AIDS               | 1 (93)                       | 9 % (4–13 %)                | -              | -     | 4.45  |       |       |
| Forces with Alcohol Use            | 6 (1684)                     | 18 % (7–33 %)               | -              | 0.0001 | 4.91  |       |       |
| Forces with Substance Use          |                              |                             |                |       |       |       |       |
| Gender                             | 44 (756218)                  | 11 % (9–13 %)               | 88.72 %        | 0.0001 | 20.10 | 12.30 | 0.001 |
| Total                              | 2 (1532)                     | 14 % (12–16 %)              | 90.00 %        | 0.0001 | 10.94 |       |       |
| Male                               | 3 (1624)                     | 20 % (14–27 %)              | 75.22 %        | 0.017 | 28.78 |       |       |
| Female                             |                              |                             |                |       |       |       |       |

Beck Scale for Suicidal Ideation-Current (BSSI-C), Brief self-report questionnaire (SCREENER), SCID DSM-IV Diagnoses, Multi-Problem Screening Inventory (MPSI), The 4-item Suicidal Behaviors Questionnaire-Short Form (SBQ-SF), The Patient Health Questionnaire(PHQ), The Self-Injurious Thoughts and Behaviors Interview (SITBI), The Suicidal Behaviors Questionnaire Revised (SBQ-R), The Columbia Suicidal Severity Rating Scale (C-SSRS), the Mini International Neuropsychiatric Interview Plus (MINI-Plus)
| Categories          | No. of Studies (Sample Size) | Pooled Prevalence (% 95 CI) | Between studies heterogeneity assessment (%) | Between subgroups heterogeneity assessment (%) |
|--------------------|-----------------------------|-----------------------------|-----------------------------------------------|-----------------------------------------------|
|                    |                             |                             | $\bar{\rho}$ | $P_{Heterogeneity}$ | $Z$ | $Q$ | $P_{Heterogeneity}$ |
| Tools              |                             |                             |             |                   |     |     |                     |
| BSSI-C Scale       | 5 (12775)                   | 11 % (7–16 %)               | 67.96 %     | 0.052             | 8.98| 24.84| 0.001               |
| SCRENNER Scale     | 1 (669)                     | 8 % (6–10 %)                | -           | -                 | 13.54| 10.23|                     |
| SCID DSM-IV Scale  | 16 (375640)                 | 7 % (5–10 %)                | -           | 0.049             | 69.80| 9.61 |                     |
| MPSI Scale         | 2 (1225)                    | 39 % (36–41 %)              | 55.21 %     | 0.850             | 53.01| 13.35|                     |
| PHQ Scale          | 15 (324540)                 | 9 % (6–13 %)                | 39 % (36–41 %)| 0.053             | 53.01| 12.25|                     |
| SITBI Scale        | 2 (443)                     | 36 % (32–41 %)              | 36 % (32–41 %)| 0.053             | 53.01| 12.25|                     |
| SBQ-R Scale        | 7 (5845)                    | 16 % (14–18 %)              | 44.34 %     | 0.053             | 0.850| 6.47 |                     |
| C-SSRS Scale       | 1 (38237)                   | 14 % (12–18 %)              | 77.69 %     |                   | 8.98 | 13.54|                     |
|                    |                             |                             | $\bar{\rho}$ | $P_{Heterogeneity}$ | $Z$ | $Q$ | $P_{Heterogeneity}$ |
| Military Statue    | 19 (98426)                  | 8 % (6–10 %)                | 50.18 %     | 0.497             | 12.14| 10.13| 0.001               |
| Active Duty        | 23 (340464)                 | 15 % (11–19 %)              | 50.18 %     | 0.497             | 12.14| 10.13| 0.001               |
| Veteran            |                             |                             | 69.80 %     |                   | 12.59|      |                     |
| Sampling Method    | 35 (133437)                 | 11 % (9–13 %)               | 77.78 %     | 0.059             | 16.11| 0.38 | 0.660               |
| Convinces Sampling | 7 (305453)                  | 13 % (7–20 %)               | 64.26 %     | 0.051             | 6.47 |      |                     |
| Random Sampling    |                             |                             |             |                   |     |     |                     |
| Type of Forces     | 4 (4851)                    | 13 % (1–35 %)               | 79.99 %     | 0.047             | 2.54 | 1.27 | 0.260               |
| Air Forces         | 23 (121644)                 | 12 % (9–15 %)               | 79.99 %     | 0.047             | 2.54 | 1.27 | 0.260               |
| Armed Forces       | 1 (100)                     | 54 % (44–64 %)              | 76.44 %     | 0.044             | 14.50|      |                     |
| Marine Forces      | 14 (312295)                 | 8 % (4–12 %)                | -           | 0.034             | 6.82 |      |                     |
| Military Forces    |                             |                             | 74.77 %     |                   |      |      |                     |

The prevalence of suicide attempted in military

| Military Statue    | 19 (98426)                  | 8 % (6–10 %)                | 50.18 %     | 0.497             | 12.14| 10.13| 0.001               |
| Active Duty        | 23 (340464)                 | 15 % (11–19 %)              | 50.18 %     | 0.497             | 12.14| 10.13| 0.001               |
| Veteran            |                             |                             | 69.80 %     |                   | 12.59|      |                     |
| Sampling Method    | 35 (133437)                 | 11 % (9–13 %)               | 77.78 %     | 0.059             | 16.11| 0.38 | 0.660               |
| Convinces Sampling | 7 (305453)                  | 13 % (7–20 %)               | 64.26 %     | 0.051             | 6.47 |      |                     |
| Random Sampling    |                             |                             |             |                   |     |     |                     |
| Type of Forces     | 4 (4851)                    | 13 % (1–35 %)               | 79.99 %     | 0.047             | 2.54 | 1.27 | 0.260               |
| Air Forces         | 23 (121644)                 | 12 % (9–15 %)               | 79.99 %     | 0.047             | 2.54 | 1.27 | 0.260               |
| Armed Forces       | 1 (100)                     | 54 % (44–64 %)              | 76.44 %     | 0.044             | 14.50|      |                     |
| Marine Forces      | 14 (312295)                 | 8 % (4–12 %)                | -           | 0.034             | 6.82 |      |                     |
| Military Forces    |                             |                             | 74.77 %     |                   |      |      |                     |

Beck Scale for Suicidal Ideation-Current (BSSI-C), Brief self-report questionnaire (SCRENNER), SCID DSM-IV Diagnoses, Multi-Problem Screening Inventory (MPSI), The 4-item Suicidal Behaviors Questionnaire-Short Form (SBQ-SF), The Patient Health Questionnaire (PHQ), The Self-Injurious Thoughts and Behaviors Interview (SITBI), The Suicidal Behaviors Questionnaire Revised (SBQ-R), The Columbia Suicidal Severity Rating Scale (C-SSRS), the Mini International Neuropsychiatric Interview Plus (MINI-Plus)
| Categories                          | No. of Studies (Sample Size) | Pooled Prevalence (% 95 CI) | Between studies heterogeneity assessment (%) | Between subgroups heterogeneity assessment (%) |
|------------------------------------|-----------------------------|-----------------------------|---------------------------------------------|-----------------------------------------------|
|                                    |                             |                             | $\hat{\theta}$ | $P_{Heterogeneity}$ | $Z$ | $Q$ | $P_{Heterogeneity}$ |
| Population                         | 35 (435640)                 | 9 % (8–11 %)                | 99.09 % | 0.0001 | 18.52 | 84.99 | 0.001 |
| Healthy Forces                     | 1 (442)                     | 5 % (4–8 %)                 | - | - | 19.33 |
| Forces with HIV/AIDS               | 1 (1210)                    | 8 % (7–10 %)                | - | - | 14.59 |
| Forces with Alcohol Use            | 5 (1598)                    | 30 % (23–36 %)              | 87.44 % | 0.0001 | 8.99 |
| Forces with Substance Use          |                             |                             |                             | 99.09 %                           |
| Forces with HCV                    |                             |                             |                             | 92.88 %                           |
| Gender                             | 37 (429113)                 | 11 % (9–13 %)               | 92.88 % | 0.0001 | 9.04 | 9.56 | 0.001 |
| Total                              | 2 (4533)                    | 3 % (2–4 %)                 | - | - | 2.49 |
| Male                               | 3 (5244)                    | 21 % (1–53 %)               | 95.91 % | 0.0001 | 10.75 |
| Female                             |                             |                             | 98.49 % | 0.0001 | 92.88 |
| Tools                              |                             |                             |                             | 66.33 %                           |
| BSSI-C Scale                       | 6 (6882)                    | 15 % (10–22 %)              | 66.33 % | 0.050 | 9.04 | 35.33 | 0.001 |
| Checklist                          | 12 (373059)                 | 5 % (3–7 %)                 | 78.31 % | 0.049 | 5.25 |
| SCID DSM-IV Scale                  | 2 (1225)                    | 36 % (33–38 %)              | 61.99 % | 0.055 | 43.39 |
| MPSI Scale                         | 4 (4675)                    | 9 % (5–15 %)                | 55.99 % | 0.039 | 6.54 |
| PHQ Scale                          | 2 (2417)                    | 4 % (4–5 %)                 | 55.99 % | 0.041 | 19.36 |
| MINI-Plus Scale                    | 3 (526)                     | 11 % (1–49 %)               | 70.05 % | 0.050 | 1.42 |
| SBQ-R Scale                        | 1 (374)                     | 8 % (5–11 %)                | 60.44 % | 0.034 | 32.48 |
| SITBI Scale                        | 2 (38330)                   | 1 % (1–2 %)                 | - | - | 10.00 |
| C-SSRS Scale                       | 3 (692)                     | 22 % (2–53 %)               | 69.01 % | 0.045 | 2.76 |
| NR                                 |                             |                             | 62.99 % | 0.045 | 2.76 |

In terms of the prevalence of suicide attempts, servicemen serving in the air force were more likely to commit suicide than ones in the army (13% vs. 12%). In the present analysis, the prevalence of suicide attempts in the navy was 54%, but this was the result of a study with a sample size of 100 people that could not be trusted and compared with the prevalence of suicide attempts in other military (Table 4).

The prevalence of suicide attempts in militaries with substance use was 30% (% 95 CI; 23–36 %), which was higher than the prevalence of suicide attempts in non-drug-using military. Also, the prevalence of suicide attempts was 8% in militaries consuming alcohol (% 95 CI; 7–10 %) and in

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Beck Scale for Suicidal Ideation-Current (BSSI-C), Brief self-report questionnaire (SCREENER), SCID DSM-IV Diagnoses, Multi-Problem Screening Inventory (MPSI), The 4-item Suicidal Behaviors Questionnaire-Short Form (SBQ-SF), The Patient Health Questionnaire (PHQ), The Self-Injurious Thoughts and Behaviors Interview (SITBI), The Suicidal Behaviors Questionnaire Revised (SBQ-R), The Columbia Suicidal Severity Rating Scale (C-SSRS), the Mini International Neuropsychiatric Interview Plus (MINI-Plus)
militaries with AIDS / HIV, it was equal to 5% (% 95 CI; 4–8 %) (Table 4). Also, suicide attempts in female soldiers was more than that in male soldiers (21% vs. 3%) (Table 4).

The prevalence of suicide attempts was also analyzed based on the tools used in the studies. The results showed that after combining studies using SCID DSM-IV diagnoses, beck scale for suicidal ideation-current (BSSI-C), multi-problem screening inventory (MPSI) and the suicidal behavior questionnaire revised (SBQ-R), the prevalence was 5% (% 95 CI; 3–7 %), 15% (% 95 CI; 10–22 %) 36% (% 95 CI; 33–38 %), 11% (% 95 CI; 1–49 %), respectively (Table 4).

**Publication bias, and meta-regression in studies related to the spread of suicide ideation and attempts**

The results of the diffusion bias were shown in Fig. 5. The results of the Eggers test represented that diffusion bias occurred in calculating the prevalence of suicidal ideation (B: 7.59, SE: 0.99, P: 0.001) and suicide attempts (B: 7.03, SE: 0.44, P: 0.001) in the military (Fig. 5). In meta-regression analysis, the effect of military age on prevalence was examined and analyzed. The results showed that age did not have a significant effect on the prevalence of suicidal ideation and suicide attempts in the military.

**Discussion**

The present study was a systematic review and meta-analysis that showed that the pooled prevalence of depression in the active military was 23%. According to the World Health Organization, the prevalence of depression in the general population is 15 to 20% (30, 31). Therefore, it can be said that the prevalence of depression in the military community is higher than that in the general community. Feeling sad in unfavorable situations such as military situations and operational locations can be one of the reasons for the increase in the prevalence of depression or in some way the occurrence of depression and its symptoms in the military. This relationship indicates the existence of a relation between activity abnormalities, mood and thoughts with social or occupational environments (32-36). On the other hand, the military may not be very interested in their job and, therefore, they have unpleasant moods and thoughts such as sadness, grief, despair and worry, which can make a military person prone to depression (37, 38). Military personnel often suffer from disorders in sleep, nutrition, physical exertion, concentration, as well as anorexia, and weight changes due primarily to job sensitivity and confidential activities. The presence of these behaviors and emotions over time and their stability for a long time have a negative effect on the mood of these people and can expose a military person to depression (39, 40). In the present meta-analysis, the pooled prevalence of depression after combining studies in which the available sampling method had been used, was equal to 21% and after combining studies that had used random sampling method to collect their samples, the pooled prevalence of depression was equal to 26%. In cross-sectional studies, the sampling method should be random in order to consider samples under investigation as a good representative of the target population. In studies that had selected this type of sampling, the pooled prevalence of depression was higher. On the other hand, the results of the subgroup analysis showed that the amount of heterogeneity after the analysis based on the sampling method has decreased, which indicated that different sampling methods in meta-analysis studies were one of the sources of heterogeneity in the total pooled prevalence in the active military.

The results of the present meta-analysis represented that the prevalence of depression was higher in active servicemen in the navy than in those in the air force and the army. The navy has more professional problems in terms of special professional missions, and more psychological problems than the army and the air force. Job-related stress, complex missions, strict rules, the possibility of injury, disability, captivity and even death are some of the issues that increase the likelihood of depression in these soldiers compared to others (41, 42). A person's psychological capacity includes a person's ability to cope with the expectations and difficulties of everyday life. High psychological capacity allows a person to maintain his/her life at the desired psychological level and crystallize this ability in the form of adaptive behaviors, effective and positive actions for himself/herself. The role of psychological capacity in promoting health and well-being in all three aspects of physical, mental and social is very important. This importance becomes even more apparent when the problem becomes behavioral. In such a case, the person is not strong enough when faced with psychological pressures and obstacles in life, and as a result, his/her inappropriate behavior will be the source of all suffering and failure (43, 44). Therefore, addressing various psychological aspects, quality of life and social relations of the military, especially the navy, in order to properly understand the conditions of these people and their families can be useful to strengthen and enhance their military capabilities and efficiency. Other reasons for the increasing prevalence of depression in the navy include family problems (45). Over the years, research has shown that the family plays an important role in providing function and activity to individuals. Having a healthy society depends on having strong families in the society. Navy families often suffer from the stress of being away from a normal life, living in unfamiliar environments, and experiencing life outside their homelands. These may cause problems within the family, which ultimately reduce the ability of the navy and cause psychological problems such as depression (46, 47).

The stress of military jobs has major and significant consequences for the family environment. Psychological disorders between military families have been reported between 3 to 15% depending on the disorder type, while they have been reported paranoid disorders, obsessive-compulsive disorders, depression, interpersonal relationships, physical problems, and aggression, respectively (47). According to research, it has been shown that the prevalence of these disorders in military families was higher than that in other families in the society. Factors such as workplace stress, sensitive and critical situations, high job responsibilities, job stress, unwanted relocation, problems in the family and home, lack of confidence in
individual abilities, mental fatigue caused by hard work, thinking the possibility of death are some of the depression and mental distress causes in the military and their families (48, 49). In a study entitled Environment, Lifestyle and Psychological Factors in the Health and Welfare of Military Families, the results showed that the psychological factors resulting from military missions were divided into 5 stages which included the stage before deployment, deployment, return, reinforcement and re-deployment, respectively. Military personnel and their families also experienced different psychological difficulties before, during, or after deployment to different missions. These experiences brought them many psychological norms that varied with different variables such as the location of the mission (in terms of the possibility of military conflict with hostile forces), duration of deployment, number of deployments, time between deployments, military responsibility, and the difficulty of working conditions of individuals at the time of deployment (50-52). The same factors may lead military personnel to use drugs, and alcohol (53). In the present meta-analysis, the prevalence of depression in the active military drug users was 37% and in the military alcohol users was 29%. Drug, and alcohol abuse can be a contributing factor to depression or other mental disorders in the military. Excessive alcohol abuse in the US military has resulted in significant financial losses. Data from 2006 showed that excessive alcohol consumption annually cost the US military 1.12 billion dollars (54, 55).

In a large survey study by Bray and Hourani, the results demonstrated that the prevalence of alcohol use in the US military was 15 to 20% (56). Also, in terms of gender, this prevalence was different and in men, alcohol consumption was 3.5 times more than that in military women. The results of studies have shown that the prevalence of alcohol and drug use in the Navy was higher than that in the Air Force, which might be related to the high prevalence of depression in the navy (57-59). Alcohol and substance abuse occur more frequently in war veterans. A study by Milliken and colleagues in a population-based study found that 12 to 15 percent of veterans experienced alcohol and substance abuse after 3 to 6 months of returning from war, which put them at risk of depression (60-62). In the present meta-analysis, the overall pooled prevalence of depression in veterans was 20%. However, in studies that had used random sampling to collect samples, the prevalence was 22%.

The prevalence of depression was 15% in active HIV-positive servicemen and 16% in HIV-positive veterans. These military personnel, of course, suffered from depression and other mental disorders due to the existence of the disease and its difficult conditions in the society. The prevalence of depression in veterans with hepatitis C was 29%. It was noteworthy that the amount of heterogeneity during the subgroup analysis based on the healthy and unhealthy military population did not significantly decrease compared to the overall prevalence of heterogeneity, which indicated the lack of the inclusion effect of soldiers with various diseases, and healthy soldiers on the amount of heterogeneity in studies. In other words, this factor could not be a source of heterogeneity when estimating the overall prevalence of depression. However, as shown in Table 4, the type of sampling (random or available), location and place of service (the air, naval or army), and various tools for measuring the prevalence of depression were the main sources of heterogeneity when estimating general depression in the military because the amount and percentage of heterogeneity had significantly decreased when performing subgroups based on these variables.

The prevalence of suicidal ideation in the present meta-analysis in the military was equal to the prevalence of suicide attempts in the entire military. Suicidal ideation was also more common in women than in military men. According to studies conducted in the world, the prevalence of suicide and its thoughts in the military had a range from 5.8% to 28.4%, which in the present meta-analysis study was exactly equal to 11%. In the study of Farsi et al., the results showed that with increasing scores of depression, the possibility of self-harm and suicide in the military increased (63). In the study by Hossieni et al., The prevalence of depressive disorders in military personnel who had attempted suicide was 0.7 to 1.3% (64). The prevalence of suicidal ideation was higher in Air Force servicemen than that in Navy and Land Force servicemen. The prevalence of suicidal ideation was 18% in the military using drug, which was higher than that in the military using alcohol. Also, the prevalence of suicide attempts in drug-using military was higher than the prevalence of suicide attempts in non-drug-using military. The results of the present meta-analysis showed that the use of drugs, alcohol and diseases such as HIV and HCV could be a predisposing factor in the development of mental disorders and the development of suicidal ideation and suicide attempts in the military. In addition, there were more thoughts and attempts to commit suicide in veterans than in active and serving soldiers. One of the effective reasons for the existence of suicidal ideation and attempts in the veterans was the lack of combat and other physical activities, living at home, consuming drugs and alcohol. The results of the present meta-analysis represented that the prevalence of suicidal ideation and attempts in military personnel using drugs were equal to 18% and 30%, respectively.

Regarding the prevalence of suicidal ideation and attempts, the results of the subgroup analysis showed that the use of different tools in determining the prevalence of suicidal ideation in the military in meta-analysis studies, different sampling methods (available or random sampling), and the type of servicemen included in the study (in-service or veterans) were among the most important factors in creating heterogeneity in determining the pooled prevalence of suicidal ideation and attempts in the military after completing the entire study.

The present meta-analysis study was the first systematic review and meta-analysis study to determine the prevalence of depressive and suicidal disorders in the entire military worldwide. Also, the exact prevalence of these disorders in the military had not been reported and this research determined the overall pooled prevalence of depression and suicidal ideation or attempts. On the other hand, the sample size in the present meta-analysis subgroup was very significant, which made the estimated prevalence in each subgroup very reliable. Other benefits of this study included determining the prevalence of depressive disorders and suicide in military personnel in various sectors, such as the navy, air, and army forces. One of the limitations of the present study was the lack of sufficient number of studies and sample sizes to determine the prevalence of depressive and suicidal disorders in servicemen with hepatitis C or other diseases. For future research, the issue of social classes, religion, and income levels need to be considered to determine the prevalence of mental disorders in the military. Also, studies on how to carry out preventive interventions, and their cost-effectiveness need to be done in order to determine effective and useful interventions in the military to prevent suicide and depression.
Conclusion

The present study showed that the prevalence of depression and suicide (thoughts and actions) was high in the military, especially in the navy and air forces, and this prevalence was more significant. On the other hand, substance and alcohol consumption were factors that increased the prevalence of depression and ultimately led to suicide in the military. Therefore, it is necessary to develop and design training and intervention programs in order to train and increase the awareness of the military, especially veterans, in order to prevent the occurrence of suicide and mental disorders such as depression. Considering the prevalence of depression and suicide in the military consuming drugs and alcohol in the present meta-analysis study, it is necessary to implement screening and follow-up measures to identify, and prevent these two disorders (drug and alcohol consumption) in the military.

Abbreviations

CI
Confidence Interval
EMBASE
Excerpta Medica dataBASE
NOS
Newcastle-Ottawa Scale
MOOSE
The Meta-Analyses of Observational Studies in Epidemiology
PRISMA
Preferred Reporting Items for Systematic Reviews and Meta-analyses
WHO
World Health Organization
DSM-IV
The diagnostic and statistical manual of mental disorders-IV
PHQ
The patient health questionnaire
SDS
The Zung self-tool report depression scale
BDI
The beck depression inventory
CES-D
The center for epidemiological studies depression
HDRS
Hamilton depression rating scale
MHI
Mental health inventory
QIDS
The quick inventory of depressive symptomatology
GDS
The geriatric depression scale
SCID DSM-IV
Structured Clinical Interview for DSM Disorders
BSSI-C
Beck scale for suicidal ideation-current
MPSI
Multi-problem screening inventory
SBQ-R
The suicidal behavior questionnaire revised
SCREENER
Brief self-report questionnaire
MPSI
Multi-Problem Screening Inventory
SBQ-SF
The 4-item Suicidal Behaviors Questionnaire-Short Form
SITBI
The Self-Injurious Thoughts and Behaviors Interview
SBQ-R
The Suicidal Behaviors Questionnaire Revised
C-SSRS
The Columbia Suicidal Severity Rating Scale
MINI-Plus
The Mini International Neuropsychiatric Interview Plus
BSI
The Brief Symptom Inventory
HADS
The Hospital Anxiety and Depression Scale
GDS
Geriatric Depression Scale
QIDS
Quick Inventory of Depressive Symptomatology

Declarations

Ethics approval and consent to participate
Not applicable because no primary data were collected.

Consent for Publication
Not applicable.

Availability of data and material
Data is available and it can be accessed from the corresponding author with reasonable inquiry.

Competing interests
The authors declare that they have no competing interests.

Funding
None.

Competing interests
The authors declare that they have no competing interests.

Funding
None.

Authors’ contributions
YM, BD, and MS conceptualized the idea for this review, formulated the review question, and objectives. All authors contributed equally to the formulation of the development of the search strategy, conducting the searches, data extraction, data analysis/interpretation, and writing the manuscript. All authors read and approved the final manuscript.

Acknowledgments
Not applicable

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