Depression among post-9/11 veterans and reservists: Need for preventive mental health care and early intervention

Alyssandra Malinisha\* and M. D. Pant, PhD, PStatb

aSchool of Health Professions, Eastern Virginia Medical School, Norfolk, United States

MaliniAM@evms.edua\*; PantMD@evms.edu b

The purpose of this research was to analyze the relationship between depression and mental health treatment patterns among post-9/11 veterans and inactive reservists. These relationships were investigated to examine the potential benefits of increasing access to mental health treatment for active-duty service members. To fulfill this research objective, logistic regression was performed on six variables that were selected as indicators for depression and treatment-seeking patterns from a dataset containing 56,136 observations and 2,471 variables. The results of this research revealed that not only is the target population more likely to have experienced a major depressive episode (MDE), received outpatient mental health treatment, and possessed an unmet need for mental health treatment within the last year, but that younger individuals within this community (18-25 years old) are less likely to have received outpatient mental health treatment within the past year. These findings suggest that depression is not only prevalent within the military community but that depression is possibly being carried over from time of service to post-service. Such implications indicate that a need exists for the implementation of greater preventive mental health services and increased accessibility to these services to help bolster early intervention efforts within the military health system.

Keywords: veterans; military personnel; Afghan campaign; military deployment; depressive disorder, major; depression; suicide; psychology, military; military psychiatry; mental health; mental health services; military health; military health services; preventive health services; public health

Subject classification codes: include these here if the journal requires them

# Introduction

According to the Veteran Affairs’ 2020 National Veteran Suicide Prevention Annual Report, the suicide rate of U.S. Armed Forces veterans is 1.5 times higher than that of the general population. In addition to this finding is the commonly cited statistic that there are 21 veteran suicides per 100,000 each day (Suitt, 2021). It is important to note, however, that these statistics exclude reservists and national guardsmen who were not federally activated (Suitt, 2021). With the inclusion of non-federally activated reservists and national guardsmen, the actual suicide rate for this population stands at 27.5 per 100,000 (Suitt, 2021). This statistic fares even worse for veterans and active-duty service members who served in or after 2001 compared to those who served during previous war eras (Suitt, 2021).

From 2005-2017 to 2018, the suicide rate for service members and veterans of the post-9/11 wars increased from 32.3 per 100,000 to 45.9 per 100,000—a rate that is 2.5 times higher than the adjusted rate for the general population (Suitt, 2021). Such staggering statistics has led McDermott (2012) to declare an “epidemic of soldier suicides”, supported by the additional finding that suicides per 100,000 service members have increased across all military branches since 2012. Perhaps the most alarming indicator of all is that deaths due to suicide among this population is *four times* higher than all deaths to have occurred during the Global War on Terror (Suitt, 2021).

## Background

A recent study has found that as many as 25% of deployed U.S. soldiers are at risk for experiencing behavioral health issues; however, of those at risk for mental health issues, only 37% of soldiers actually receive mental health treatment (Nugent et al., 2020). To further exacerbate this issue, of those who do receive help, only 18-28% are reported to receive help from a provider (Kim et al., 2016; Nugent et al., 2020). Similarly, additional studies have reported that as many as one-third of service members (across all military branches) display symptoms of psychological health or cognitive issues after returning from deployment (Denning et al., 2014). This, in turn, not only places military members at an increased risk for suffering from undiagnosed mental health disorders or behavioral health issues, but places them at greater risk for adverse events such as suicide (Hyman et al., 2012).

Specifically, as it relates to post-9/11 service members, there has been a 65% increase in counts and rates of mental health disorders from 2000 to 2011 (O’Donnell, 2012). Meanwhile, Iraqi and Afghanistan war era veterans have been found to have a 41% to 61% higher risk of suicide when compared to the general population with depression accounting for 16.9% of new mental health diagnoses among this demographic (Kang et al., 2015). Such figures on suicide rates and depression diagnoses within this population are particularly concerning given the high correlation that exists between depression and suicide ideation, attempts, and completion (Kang et al., 2015).

The significance of depression within the military community as a military behavioral health topic is not only supported by the aforementioned findings and statistics, but should garner concerted efforts between the military research community and the military health system being that 15 to 20 percent of depressed veterans die by suicide (Kang et al., 2015). While the topic of military mental health has, indeed, received increased attention over the last couple of decades, structural barriers (such as the number of available providers, provider hours, and scheduling practices) to mental health treatment still continues to persist within the military health system (Jennings et al., 2016; Tanielian et al., 2016). For this reason, the intention of this research is to provide evidence for the potential benefits of increased accessibility to mental health treatment for active-duty service members via analyzing the links between depression rates and mental health treatment patterns among post-9/11 veterans and inactive reservists.

## Research Questions and Hypotheses

To achieve the objective set forth by this research, four research questions were developed:

* Veterans and reservists who were active-duty in or after 2001 v. the general population:

1. *How is active-duty status related to the occurrence of major depression episodes (MDE)?*
2. *How does active-duty status affect mental health treatment-seeking behavior?*
3. *How is active-duty status related to the presence of an unmet need for mental health treatment?*

* Among veterans and reservists who were active-duty in or after 2001:

1. *How is mental health treatment seeking behavior related to age?*

To formulate and answer the following hypotheses:

**Hypothesis 1**

* **H0:** Whether or not a major depressive episode was experienced within the last year (AMDEYR[[1]](#footnote-1)) is unrelated to active-duty status in or after 2001 (ACTD20011).
* **HA1:** Whether or not a major depressive episode was experienced within the last year (AMDEYR1) is related to active-duty status in or after 2001 (ACTD20011).

**Hypothesis 2**

* **H0:** There is no association between whether or not outpatient mental health treatment was received within the last year (AUOPTYR1) and active-duty status in or after 2001 (ACTD20011).
* **HA2:** There is an association between whether or not outpatient mental health treatment was received within the last year (AUOPTYR1) and active-duty status in or after 2001 (ACTD20011).

**Hypothesis 3**

* **H0:** Whether mental health treatment was needed but not received within the last year (AUUNMTYR1) is not associated with active duty-status in or after 2001 (ACTD20011).
* **HA3:** Whether mental health treatment was needed but not received within the last year (AUUNMTYR1) is associated with active duty-status in or after 2001 (ACTD20011).

**Hypothesis 4**

* **H0:** Whether outpatient mental health treatment was received within the last year (AUOPTYR1) is not associated with age category (CATAG21) among those who were active duty in or after 2001 (ACTD20011).
* **HA4:** Whether outpatient mental health treatment was received within the last year (AUOPTYR1) is associated with age category (CATAG21) among those who were active duty in or after 2001 (ACTD20011).

**Materials and Methods**

***Study Design***

This research project will utilize a retrospective case-control design to test all four hyp-

otheses (HA1-4).

## Study Population

The target population for this research includes male and female veterans and inactive-reservists who are at least 18 years of age or older and were active-duty in or after 2001. A dataset consisting of 56,136 observations was used to create a subset of data for 1,787 males and females, both active-duty and non-active-duty on or after 2001 for the testing of H1-3 while a second subset of 670 veterans and inactive-reservists who served in or after 2001 (Substance, 2020) was created for the testing of H4. Military youth, dependents, and spouses/other family members have been excluded from this research.

## Data Source and Variable Selection

Data collection for this project involved using a private computer to access and download public use data from the Substance Abuse and Mental Health Service Administration (SAMHSA)’s website. SAMHSA is a federal agency that conducts research on behavioral health, and collects behavioral health data from across the United States every year (Substance, 2021). The specific dataset used for this research is from SAMHSA’s National Survey on Drug Use and Health (NSDUH) for 2019[[2]](#footnote-2) (Substance, 2020). Of the for 2,471 variables included within the NSDUH dataset, six variables were utilized for the testing of all four hypotheses1. The independent variables selected for HA1-4 include ACTD20011 and CATAG21. Meanwhile, the variables AMDEYR1, AUUNMTYR1, and AUOPTYR1 serve as the dependent variables for HA1-4. Lastly, the variable ADTMTHLP1 was used to generate and compare frequency distributions on the perceived effectiveness of mental health treatment received in the last 12 months by those who were and those who were not active-duty in or after 2001.

## Data Collection Procedure

The NSDUH dataset for 2019 (Substance, 2020) was first downloaded from the SAMHSA data archive website (SAMHDA) in .txt format onto the designated private computer for importing into RStudio ([2019 NSDUH Survey](https://www.datafiles.samhsa.gov/dataset/national-survey-drug-use-and-health-2019-nsduh-2019-ds0001)).

### Data Protection and Storage

Data protection measures used during this project include conducting all parts of the data collection, analysis, and reporting processes over a secure, private, password protected network on a password protected personal laptop that utilizes computer security software. The 2019 NSDUH dataset (Substance, 2020) does contain identifiable information in the form of unique record identifiers (QUESTID22) and file dates (FILEDATE2), however neither of these variables were used or included for the conducting of this research. The designated private laptop that was used for the storage of the data collected for the purposes of this project is located within a private residence and is not shared with any other individuals.

## Data Analysis

Binomial logistic regression was selected to determine whether a relationship exists between the variables for HA1-4. This statistical method was chosen over a non-parametric test such as the chi-square test for independence as the intention of this research is to determine more than just the presence of an association between the variables. By conducting logistic regression of the variables for HA1-4, the basis for a more sophisticated, predictive model for future research endeavors could be established. The assumptions for logistic regression of the data were met through the use of binary variables and large sample sizes and by confirming independence among observations. The effect that each independent variable has on its respective response variable, in the form of calculated odds ratios (ORs), was then determined through calculating the exponential value of each dependent variable’s coefficient. The R statistical software program was used to perform all statistical analyses for the testing of all hypotheses.

# Results

Statistical analyses of the respective data subsets for H1-4 resulted in the rejection of the null hypothesis for all hypotheses[[3]](#footnote-3). Those who experienced a major depressive episode within the last year (AMDEYR1) were 2.04 [CI: 1.43 – 2.93]3 times more likely to have been active-duty in or after 2001 (ACTD20011). Meanwhile, respondents who were active-duty in or after 2001 were 2.01 [CI: 1.47 – 2.76]3 times more likely to have received outpatient mental health treatment within the last year (AUOPTYR1) compared to those who were not active-duty during the same timeframe. Still, individuals who reported being active-duty during this time period were found to be 3.03 [CI: 2.01 – 4.64]3 times more likely to report needing mental health treatment within the last year but not receiving it (AUUNMTYR1) compared to those who were not active-duty during the same year(s). Lastly, those who were 26 or older and were active-duty in or after 2001 were 2.75 [CI: 1.32 – 6.70]3 times more likely to have received outpatient mental health treatment within the last year (AUOPTYR1) compared to those younger than 26 years old with the same active-duty status.

A further crosstabulation was performed using the variables ADTMTHLP1 and ACTD20011. Perceived level of treatment effectiveness was determined both for those who received mental health treatment for depression among both individuals who served and those who did not serve in the U.S. Armed Forces in or after 2001[[4]](#footnote-4). By calculating the frequency of each perceived level of treatment effectiveness, it was not only determined that the majority of those who received mental health treatment for depression reported some degree of satisfaction with treatment (ADTMTHLP1 >= 2), but also that those who served in or after 2001 reported higher levels of satisfaction with treatment compared to those who were not active-duty during the same period of time.

# Discussion

Based on the results obtained from the binomial logistic regression of the variables outlined in H1-43, this research concludes that active-duty status in or after 2001 is associated with the occurrence of major depression among veterans and inactive reservists3. In addition to this, having received outpatient mental health treatment and the presence of a perceived unmet need for mental health treatment was also found to be associated with active-duty status in or after 2001 for individuals of the same group3. Meanwhile, older veterans and inactive reservists (26 or older) who served during this timeframe were found to be more likely to receive outpatient mental health treatment when compared to their younger counterparts (18 to 25 years old) 3. Lastly, a cross-examination of reported satisfaction levels with mental health treatment received for depression between those who were not and those who were active-duty in 2001 revealed that the latter group reported higher levels of satisfaction with treatment4.

While this research targeted veterans and inactive reservists instead of active-

duty military personnel, the conclusions from this research align with parallel studies that indicate that deployed, active-duty military members have greater odds or are at greater risk of developing behavioral health issues (Denning et al., 2014; Hayman et al., 2012; Inoue et al., 2021; Kang et al., 2015; Kim et al., 2016; McDermott, 2012; Nugent et al., 2020; O’Donnell, 2012; Office, 2020; Suitt, 2021). Elevated depression rates among veterans and inactive reservists can arguably be linked to findings such as Nugent et al.’s (2020) which indicate that only 37% of deployed military members in need of behavioral health treatment receive treatment, while only 18-28% of that 37% percent receive treatment from a professional (Kim et al., 2016). From this perspective, it can be suggested that mental health treatment is being delayed among active-duty military personnel until retirement, separation, or change to inactive status which is therefore driving elevated depression rates among veterans and other inactive service members. This premise is also supported by the finding that younger (18- 25 years old) veterans and inactive reservists are less likely to receive outpatient mental health services when compared to older (26 or older) members of the same group3, who are likely to have been inactive for a longer period of time. Furthermore, the association between active-duty status in or after 2001 and the presence of an unmet need for mental health treatment3 coincides with previously discussed structural barriers to and career-related stigma towards mental health treatment within the military community (Acosta et al., 2014; Jennings et al., 2016, Nugent et al., 2020). However, reported satisfaction levels with received mental health treatment reveal that those who served in or after 2001 experienced greater satisfaction levels for the treatment of depression when they received treatment compared to those who were not active-duty during the same time period. This particular finding suggests that those who serve in the military

stand to experience even greater benefits from receiving mental health treatment.

## Implications

The implications for the findings from this research include not only greater awareness of how depression impacts veterans and inactive reservists who served during the era of Operation Enduring Freedom and Operation Iraqi Freedom, but also calls to attention the notion that depression is possibly being carried over from time of service to post-service. As such, further research should examine the delivery of mental health services to active-duty service members, particularly the deployed, as a preventive measure against developing behavioral health issues during and after active-duty service. An approach worthy of consideration for delivering treatment services to active-duty service members is tele-mental health (Madsen et al., 2021), which may help combat the barriers that service members face when seeking out behavioral health services. Conducting such research in a clinical setting would also be beneficial in exposing military participants to this form of treatment (and, therefore, generating acceptance among military members) all the while determining the effectiveness of tele-mental health as a delivery method for mental health treatment within the military community.

## Limitations

While the findings of this research stand to benefit active-duty military members through future research endeavors, benefits to be had among this community could only be inferred based on conclusions made from data collected on veterans and inactive-reservists. Furthermore, this research was limited by excluding those who served in the military before 2001. The decision to focus research efforts on those who served in or after 2001, however, was made to reflect the most recent cohort of military personnel (which includes those who became eligible for retirement in 2021 after 20 years of service) as well as to reflect the cohort of service members who were most likely to have served during the Global War on Terror under Operation Enduring Freedom/Operation Iraqi Freedom.

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1. Refer to data dictionary (Table 1) for complete variable information on selected variables. [↑](#footnote-ref-1)
2. . Refer to attached file for complete dataset information from SAMHSA’s 2019 NSDUH. [↑](#footnote-ref-2)
3. . Refer to Table 3. [↑](#footnote-ref-3)
4. . Refer to Figure 1. [↑](#footnote-ref-4)