Int J Public Health 54 (2009) S61–S67
1661-8556/09/010S61-7
DOI 10.1007/s00038-009-0008-z

Original article

Psychological distress and mental health treatment among persons with and without active duty military experience, Behavioral Risk Factor Surveillance System, United States, 2007

Marc A. Safran[1], Tara W. Strine[1], Satvinder S. Dhingra[1], Joyce T. Berry[2], Ron Manderscheid[3], Ali H. Mokdad[1]

[1] *Centers for Disease Control and Prevention, Atlanta, GA, USA*
[2] *Substance Abuse and Mental Health Services Administration, Washington, DC, USA*
[3] *Mental Health and Substance Use Programs, Constella Group, LLC, Durham, NC, USA*

Submitted: 16 October 2008; revised: 10 February 2009; accepted: 12 March 2009

Published Online First 02 May 2009

Abstract

Objectives: To examine self-reported psychological distress (K-6 scale) and mental health treatment among persons with and without active duty U.S. military experience (ADME) currently residing in private residences in the U.S.

Methods: Analysis of 2007 Behavioral Risk Factor Surveillance System data from 35 states, District of Columbia, and Puerto Rico (n = 202,029 for those answering all K-6 questions, the treatment question, and the ADME question)

Results: Adjusting for age, sex, race/ethnicity, and education, overall mean K-6 scores of those with and without ADME were similar (p = 0.3223); however, more of those with, vs. without, ADME reported current mental health treatment (11.7 % vs. 9.6 %, p = 0.0001). Those with ADME receiving such treatment had a higher mean K-6 score (7.7) than those without ADME receiving such treatment (6.9) (p = 0.0032).

Conclusions: Community-dwelling persons with ADME have similar demographically-adjusted mean K-6 psychological distress scores, but greater likelihood of recent mental health treatment, compared to those without ADME.

Keywords: Mental health – Veterans – Military personnel – Psychological stress – Depression – Anxiety.

Introduction

Mental health sequelae of combat experience can continue for many years,[1,2] sometimes remitting, and sometimes recurring in response to stressors. In nineteenth century America, such sequelae were poorly understood and poorly treated.[3] Better understanding of psychiatric sequelae of combat experience and more helpful treatments developed during the twentieth century, and continue to evolve.

United States counties, towns, cities, and states are home to a large number of persons with active duty military experience, mostly former military personnel, but some still currently on active duty. It was estimated in 2007 that the United States had approximately 23,532,000 living military veterans,[4] i. e., former active duty military members who were discharged under conditions other than dishonorable. In addition, there were roughly a million active duty members of the Armed Forces stationed in the United States and territories,[5] some of whom resided in military housing, and some of whom did not. Those who did not reside in military housing generally resided in private housing in communities near where they were stationed.

We sought to estimate the mean levels of self-reported psychological distress (K-6 scale) and mental health treatment among persons with and without active duty U.S. military experience currently residing in private residences in 35 states, the District of Columbia, and Puerto Rico. Persons with active duty military experience (+ADME) would include living former active duty service members and current active duty service members who reside in private, off-post, non-institu-

Int J Public Health 54 (2009) S61–S67

Table 1. Unadjusted and adjusted mean Kessler-6 (K-6) score, and percentage currently receiving treatment, for persons with and without active duty military experience, Behavioral Risk Factor Surveillance System, 2007 (N = 202,029).

	Unadjusted Mean K-6 score	p-value for means	Adjusted mean K-6	p-value mean	unadjusted % currently receiving treatment	p-value treatment	Adjusted % currently receiving treatment*	p-value treatment
Persons **with** active duty military experience**	2.9	<0.0001	3.4	0.3223	9.7	0.0011	11.7	<0.0001
Persons **without** active duty military experience	3.5		3.4		10.8		9.6	

* Adjusted for age, sex, race/ethnicity, and education

** Those answering "yes" to the following question were classified as persons with active duty military experience for the purpose of this study: "Have you ever served on active duty in the United States Armed Forces, either in the regular military or in a National Guard or military reserve unit? Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War."

tional housing in the states and jurisdictions surveyed. Thus, the vast majority of the +ADME population would be comprised of veterans.

Methods

Data were analyzed on over 200,000 respondents from the 2007 Behavioral Risk Factor Surveillance Survey (BRFSS). The BRFSS is a random probability household survey of persons over age 18 regarding a variety of public health topics, and is conducted annually through the collaboration of U.S. states, other U.S. jurisdictions, and the Centers for Disease Control and Prevention (CDC). The survey is conducted by telephone. In 2007, state health departments, in collaboration with CDC and the Substance Abuse and Mental Health Services Administration (SAMHSA), implemented a Mental Illness and Stigma Module in 35 states, the District of Columbia, and Puerto Rico. The survey methodology has been extensively described in the scientific literature.[6,7,8] Further information about the BRFSS, its methodology, and copies of the survey questionnaires are available at www.cdc.gov/brfss.

Six questions on the Mental Illness and Stigma Module examine psychological distress as measured by the Kessler-6 (K6) scale.[9] A score derived from the sum of the scores of the responses to each of the individual K6 questions was used to provide a rough, non-specific, gauge of population needs for mental health services. Kessler-6 (K-6) scores can range from 0 to 24, and some refer to scores of 13 or higher as "severe psychological distress." Each of the K-6 questions began with the same phrase: "During the past 30 days, about how often did you feel…?" The feelings inquired about in these six questions are: 1) "nervous"; 2) "hopeless"; 3) "restless or fidgety"; 4) "so depressed that nothing could cheer you up?"; 5) "everything was an effort"; 6) "worthless". For each question, an answer of "All" was coded as a 4; "Most" was coded a 3; "Some" was coded a 2, "A little" was coded a 1; and "None" was coded 0.

Self-reported mental health treatment was defined by an affirmative answer to the question: "Are you now taking medicine or receiving treatment from a doctor or other health professional for any type of mental health condition or emotional problem?"

Respondents were classified as having active duty military experience if they answered affirmatively to the question: "Have you ever served on active duty in the United States Armed Forces, either in the regular military or in a National Guard or military reserve unit?" The question's instructions specified that "Active duty does not include training for the Reserves or National Guard, but DOES include activation, for example, for the Persian Gulf War." In this manuscript: the abbreviation ADME will be used to mean active duty military experience; +ADME will be used to designate those classified as having active duty military experience; and –ADME will be used to designate those without active duty military experience.

Data were available for 202,029 respondents who answered all the K6 questions, the question on ADME, and the question on current mental health treatment in the 35 states, the District of Columbia, and Puerto Rico. To account for the complex survey design, we used SUDAAN (RTI International, release 9.0.1, Research Triangle Park, NC, 2007) to calculate means and 95 % confidence intervals (95 % CIs). Proc regress was used to examine adjusted mean K6 scores, and proc rlogist using conditional marginals was used to examine the adjusted prevalence estimates for persons currently in mental health treatment. Linear and logistic regression models were adjusted for age, sex, race/ethnicity, and level of education.

	Unadjusted Mean score	p-value mean	Adjusted Mean score**	p-value mean
Question 1**				
+ADME	0.22	<0.0001	0.30	0.1162
–ADME	0.29		0.28	
Question 2**				
+ADME	0.64	<0.0001	0.72	0.0549
–ADME	0.76		0.75	
Question 3**				
+ADME	0.26	<0.0001	0.36	0.9650
–ADME	0.37		0.36	
Question 4**				
+ADME	0.71	<0.0001	0.82	<0.0001
–ADME	0.90		0.89	
Question 5**				
+ADME	0.23	0.0078	0.29	0.0262
–ADME	0.27		0.26	
Question 6**				
+ADME	0.81	<0.0001	0.90	0.9578
–ADME	0.91		0.90	

Table 2. Mean scores for responses to individual K-6 questions by persons with (+) and without (–) active duty military experience (ADME), with possible responses graded 0–4, Behavioral Risk Factor Surveillance System, 2007. (N = 202,029).

* Adjusted for age, sex, race/ethnicity, and education
** During the past 30 days, about how often did you feel…
(Question 1) nervous
(Question 2) hopeless
(Question 3) restless or fidgety
(Question 4) so depressed that nothing could cheer you up?
(Question 5) everything was an effort
(Question 6) worthless"
For each question, a response of All = 4; Most = 3; Some = 2; A little =1; None = 0

Results

Approximately 11.8% (95% CI: 11.6–12.1) of persons in the study identified themselves as having active duty military experience (ADME). The mean unadjusted K-6 score for those with ADME was 2.9 and for those without was 3.5 ($p < 0.0001$). After adjusting for age, sex, race/ethnicity, and level of education, however, the mean K-6 score for those with and without ADME was the same (3.4) (Table 1).

The unadjusted mean scores for each of the six K6 questions were significantly lower for those with than without ADME (Table 2). After adjusting for age, sex, race/ethnicity, and education, those with ADME still had a significantly lower mean score only for question 4 ("During the past 30 days, about how often did you feel so depressed that nothing could cheer you up?").

Approximately 9.7% of those in the study with ADME reported receiving mental health treatment, as compared to 10.8% of those without ADME ($p = 0.0011$). After adjusting for age, sex, race/ethnicity, and education, 11.7% of those with ADME reported receiving mental health treatment, compared to 9.6% of those without ($p < 0.0001$) (Table 1).

An additional calculation was performed to compare the likelihood of receiving mental health treatment for persons with ADME who had "any kind of health care coverage" versus persons without ADME who had "any kind of health care coverage." The odds of receiving mental health treatment were 23% greater for covered persons with ADME as compared to covered persons without ADME, OR = 1.23 (CI: 1.11–1.35), adjusting for age, sex, race/ethnicity, and education (data not presented).

Among persons receiving treatment for a mental health condition, the unadjusted mean K-6 score was 7.5 for those with ADME and 7.0 for those without (Table 3). After adjusting for age, sex, race/ethnicity, and education, those with ADME who got mental health treatment had a higher mean K6 score (7.7), than those without ADME who received such treatment (6.9) ($p = .0032$) (Table 3).

Those with ADME who received mental health treatment, vs. those without ADME who received such treatment, were sig-

Int J Public Health 54 (2009) S61–S67

Table 3. Comparison of persons with (+) and without (–) active duty military experience (ADME) with respect to mean K6 score by age category, sex, and mental health treatment status, Behavioral Risk Factor Surveillance System, 2007.

	N	Unadjusted Mean K-6 score	p-value mean	N	Adjusted Mean K-6 score*	p-value mean
<45 +ADME	3,925	3.5	0.2024	3,896	3.7	0.9758
<45 –ADME	57,342	3.7		57,027	3.7	
45–65 +ADME	11,596	3.0	<0.0001	11,499	3.3	0.8190
45–65 –ADME	77,481	3.3		76,887	3.3	
>65 +ADME	11,924	2.2	<0.0001	11,757	2.5	0.0076
>65 –ADME	39,452	2.9		38,839	2.7	
Male +ADME	25,060	2.8	<0.0001	24,683	3.2	0.5892
Male –ADME	50,331	3.4		49,607	3.3	
Female +ADME	2,512	3.1	0.0004	2,469	3.4	0.1046
Female –ADME	125,103	3.6		123,146	3.6	
Treatment +ADME	2,695	7.5	0.0290	2,655	7.7	0.0032
Treatment –ADME	23,371	7.0		23,096	6.9	
No treatment +ADME	24,742	2.4	<0.0001	24,369	2.8	0.0001
No treatment –ADME	151,221	3.1		148,864	3.0	

*Age group statistics for mean K-6 are adjusted for sex, race/ethnicity, and education; male and female statistics are adjusted for age, race/ethnicity, and education; and treatment and non treatment group statistics are adjusted for age, sex, race/ethnicity, and education.

nificantly more likely to have K-6 scores of greater than or equal to 13 (19.4% vs. 15.4%) (p = 0.0305), adjusting for age, sex, race, and education (data not presented).

Those with ADME who did not receive treatment had a lower mean K-6 score (2.8), adjusted for age, sex, race/ethnicity, and education, than those without ADME who did not receive such treatment (3.0) (p = 0.0001). (Table 3)

Persons with ADME under age 45 and persons age 45 to 65 showed no significant differences in overall mean K-6 scores from persons in their respective age groups without ADME after adjusting for sex, race/ethnicity, and education (Table 3). However, when only persons in each of those age groups who were in mental health treatment were considered, those with ADME had significantly higher adjusted mean K-6 scores than those without (Table 4).

Persons with ADME aged greater than 65 had a lower mean K-6 score (2.5) than those in the same age group without ADME (2.7) after adjusting for sex, race/ethnicity, and education (p = .010) (Table 3). However, if only persons in that age group who were in mental health treatment were considered, there was no significant difference in the mean K-6 score for persons with and without ADME (Table 4).

When persons who were aged 65 or less with ADME were compared to persons over age 65 with such experience, without any adjustment, 11.2% (10.3–12.1%) of the younger age group reported current mental health treatment, compared to 6.7% (6.0–7.4) of those over 65, and this difference was statistically significant (p <0.0001). When persons age 65 and under who lacked ADME were compared to persons over age 65 who lacked such experience, 10.9% (10.6%–11.2%) of the younger age group reported current mental health treatment, as compared to 10.4% (9.9%–11.0%) for the older age group, and this difference was not statistically significant (p = 0.1153) (data not presented).

Persons age 65 and younger with ADME had higher mean K6 scores than older persons with such experience, 3.2 vs. 2.1 (p <0.0001). Persons age 65 and younger without ADME had higher mean K-6 scores than older persons without such experience, 3.6 vs. 2.6 (p <0.0001) (data not presented).

Prior to adjusting for age, race/ethnicity, and level of education, males and females with ADME each had lower mean K-6 scores than their comparison groups that lacked such experience (Table 3). However, after adjusting for age, race/ethnicity, and level of education, no significant differences in mean K-6 scores were found between males with ADME and males without ADME, nor between females with ADME and females without.

Int J Public Health 54 (2009) S61–S67

	N	Unadjusted mean K6 among those receiving treatment	p-value	N	Adjusted mean K6 among those receiving treatment	p-value
<45 +ADME	396	8.6	0.0116	394	8.5	0.0156
<45 –ADME	6,677	7.1		6,644	7.1	
45–65 +ADME	1,454	7.8	0.0273	1,436	7.8	0.0355
45–65 –ADME	12,388	7.1		12,308	7.1	
>65 +ADME	840	5.4	0.2655	825	5.8	0.6744
>65 –ADME	4,226	5.7		4,144	5.6	
Male +ADME	2,257	7.7	0.2207	2,222	8.2	0.0003
Male –ADME	4,459	7.3		4,397	7.1	
Female +ADME	438	6.3	0.1183	433	6.6	0.5965
Female –ADME	18,912	6.8		18,699	6.8	
18–65 +ADME	1,850	8.1	0.0009	1,830	8.0	0.0021
18–65 –ADME	19,065	7.1		18,95	7.1	
>65 +ADME	840	5.4	0.2655	825	5.8	0.6744
>65 –ADME	4,226	5.7		4,144	5.6	

Table 4. Comparison of persons with (+) and without (–) active duty military experience (ADME) with respect to mean K6 scores among persons currently receiving mental health treatment, Behavioral Risk Factor Surveillance System, 2007.

Age group statistics for mean % receiving treatment are adjusted for sex, race/ethnicity, and education; male and female statistics are adjusted for age, race/ethnicity, and education.

Discussion

This survey found overall mean K-6 scores adjusted for age, sex, race/ethnicity, and education, to be similar for those with and without active duty military experience, which suggests a similar overall mean level of psychological distress among both populations, to the extent measured by this scale.

This survey found persons with active duty military experience significantly more likely to have received mental health treatment than those of similar age, sex, race/ethnicity, and education who never had active duty military experience.

Persons with active duty military experience who received mental health treatment had a higher mean K6 psychological distress score than persons of similar age, sex, race/ethnicity, and education, who received mental health treatment but never had active duty military experience. This difference is statistically significant, though it is not large in terms of the overall difference in mean scores.

While not all who serve in the military experience combat, adverse psychological effects of exposure to combat stressors can persist for many years.[1,2] Therefore, one might expect that persons with active duty experience, on average, would have higher levels of distress than those found in this survey. However, military admission requirements would have tended to screen out applicants with more severe mental illness, and those with other severe illnesses, thereby potentially lowering the initial average baseline distress levels among new recruits.

Access to treatment through government insurance and medical facilities may have contributed to the greater use of mental health treatment by persons with active duty military experience, and to keeping their overall mean psychological distress score no greater than for persons without active duty military experience. Military training, camaraderie, and innate strengths of individual active duty service members may have also helped to mitigate some distress.

The finding that persons with active duty military experience who received mental heath treatment, specifically those ages 18 to 65, had higher mean K-6 scores than those without active duty military experience who received such treatment in the past 30 days may indicate that persons with active duty military experience who are in treatment have greater distress, worse illness, and/or greater mental health treatment needs. The fact that this finding was limited to persons age 18 to 65 could be a result of those under age 65 having more recent precipitating stressors, while most of those over age 65 would have had more time to recover and come to terms with any prior service-related stressors or readjustment challenges (e.g., regarding home life, employment, etc.). Another potential explanation could be that factors related to the nature of treatment itself could have caused more distress or could have been less effective in some persons with active military experience who are under age 65, as compared to those over age 65.

It is possible that the lower mean psychological distress score, and lower prevalence of use of mental health services, for persons with active duty military experience who were over age 65, relative to those younger, may have been reflective of a healthier cohort, different enlistment standards and requirements, different demographics, different wars, different combat, post-combat and general life experience, different levels of support, survival effects, resiliency, and/or, as alluded to previously, the passage of time. Conversely, it is possible that persons with active duty military experience who were over age 65 may have been less willing to acknowledge mental health-related concerns due to greater stoicism or greater stigma accorded mental health issues.

As the younger cohorts of persons with active duty military experience, now under age 65, advance in years, it is unknown whether those advancing cohorts will retain their current parity in average psychological distress scores as compared to those of similar, age, sex, race/ethnicity, and education, who lack such experience, nor whether they might evolve to have relatively lower, or higher, scores. Some additional factors that may influence psychological distress levels for current and future generations of persons with and without active duty experience include acceptability, accessibility, and affordability of helpful mental health treatments and of mentally healthy lifestyle choices.

Mental health measurement tools used in public health surveillance, and knowledge about them, continue to evolve. The public health community's willingness and resources available to include specific mental health questions in large general purpose public health surveys are also evolving. It is possible that some states that did not include the mental health questions in their version of the BRFSS may have differed in ways relevant to this study from states that did.

This survey had all of the limitations considered inherent in a telephone-administered questionnaire. For example, persons without access to phones were excluded; the information provided by respondents was not subject to confirmation; questions asked were limited in number to increase the likelihood respondents would complete the survey; and participant responses may potentially have been influenced by interviewer presence on the other end of the phone line. In addition, it is possible that some persons with psychological distress (or with distinct types of psychological distress) may have been less, or more, likely to agree to participate in the survey than those without.

Given the definition of persons with active duty military experience used in this study, some of those respondents classified as such would have still been on active duty. The survey only sampled private households, so only active duty personnel living in private housing, outside of military posts, bases, hospitals, and rehabilitation centers, and not currently serving abroad would have been included. Moreover, the module containing questions regarding deployment status was not utilized by the states, and the survey does not contain questions on wartime physical injuries sustained. Questions that differentiate current active duty service members from the relatively larger number of persons whose active duty was in the past may be helpful if included in future surveys.

In summary, adjusting for age, sex, race/ethnicity, and education, we found that community-dwelling persons with active duty military experience have similar demographically-adjusted mean K-6 psychological distress scores, but greater likelihood of recent mental health treatment, compared to those without active duty military experience. There is a need for more research to better understand the nature, prevalence, and public health significance of psychological distress among persons and populations with active duty military experience, and across all populations. More also needs to be learned about how psychological distress and illness may be attenuated by personal and population strengths, resiliency, and other factors. Such understanding might aid in the development of enhanced prevention, treatment, and surveillance strategies to better meet veterans' mental health needs.

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention or any other United States Government agency.

Int J Public Health 54 (2009) S61–S67

References

1. Mental Health: A Report of the Surgeon General. Rockville, MD: United States Department of Health and Human Services, Substance Abuse and Mental Health Services Administration. Center for Mental Health Services, National Institutes of Health, National Institute of Mental Health, 1999.

2. Prigerson HG, Maciejewski PK, Rosenbeck RA. Population attributable fractions of psychiatric disorders and behavioral outcomes associated with combat exposures among US men. Am J Public Health 2002;92:59–63.

3. Davidson JRT. Posttraumatic Stress Disorder and Acute Stress Disorder. In: Kaplan HI, Sadock BJ, eds. Comprehensive Textbook of Psychiatry, sixth ed. Baltimore: Williams and Wilkins, 1995, 1227–36.

4. Department of Veterans Affairs estimate as of September 2007. (Accessed July 18, 2008 at http://www.va.gov).

5. Department of Defense Active Duty Military Personnel Strengths by Regional Area and by Country. (Accessed July 18, 2008 at http://www.defenselink.mil, and April 2, 2009 at http://www.globalsecurity.org)

6. Mokdad AH, Stroup DF, Giles WH. Public health surveillance for behavioral risk factors in a changing environment. Recommendations from the Behavioral Risk Factor Surveillance Team. MMWR Recomm Rep 2003; 52(RR-9):1–12.

7. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System User's Guide. Atlanta: U.S. Department of Health and Human Services, 2006. (Accessed June 10, 2008 at ftp://ftp.cdc.gov/pub/Data/BRFSS/userguide.pdf).

8. Holtzman D. The Behavior Risk Factor Surveillance System. In: D.S. Blumenthal and R.J. DiClemente, eds. Community-based health research issues and methods. New York: Springer, 2004:115–31.

9. Kessler RC, Barker PR, Colpe LJ, et al. Screening for serious mental illness in the general population. Arch Gen Psychiatry 2003;60:184–9.

Address for correspondence

Marc A. Safran, MD, MPA
CAPT, U.S. Public Health Service,
Centers for Disease Control and Prevention
1600 Clifton Road, Mail Stop E-44,
Atlanta, GA 30333
USA
E-mail: MSafran@cdc.gov