

Special Operations Forces and Incidence of Post-Traumatic Stress Disorder Symptoms

Matthew Hing, MD; Jorge Cabrera, MD; Craig Barstow, MD; Robert Forsten, DO

ABSTRACT

To determine the rates of Post-traumatic Stress Disorder (PTSD) positive symptom scores in Special Operations Forces (SOF) personnel, an anonymous survey of SOF was employed, incorporating the PTSD Checklist (PCL-M) with both demographic and deployment data. Results indicate that all SOF units studied scored above the accepted cut-offs for PTSD positive screening.¹ When total symptom severity score exceeded established cutoff points and were combined with criteria for Diagnostic and Statistical Manual of Mental Disorders, Edition 4 (DSM-IV) diagnosis of PTSD,² approximately 16–20% of respondents met scoring threshold for positive screening, almost double those of conventional Army units. Collectively, Special Forces (SF) Soldiers and SOF combat-arms Soldiers had significantly higher PCL-M scores than their non-combat-arms SOF counterparts. SOF Soldiers with three or more deployments to Afghanistan had significantly higher PCL-M scores. Considering the evidence suggesting that SOF Soldiers are hyper-resilient to stress, these results should drive further research schemata and challenge clinical assumptions of PTSD within Special Operations.

Conflicts-of-Interest Disclosures

The authors of this survey indicate that within the past year, they do not have significant financial or professional relationships with any commercial entity whose product or services are related to the topic or subject matter.

Disclaimer

The views expressed in this article are those of the authors and do not reflect the official policy or position of the United States Army Special Operations Command, the Department of the Army, the Department of Defense, or the United States Government.

Introduction

Post-traumatic stress disorder (PTSD) is a clinical threat to optimal wellness and Soldiers' performance. Current

evidence regarding Soldiers' risk factors, negative impacts on health, and barriers to care for PTSD within conventional United States (U.S.) military forces^{3,4} persuades providers and commanders to seriously consider PTSD as a potential threat to the health and readiness of our SOF personnel. Many possible negative consequences of PTSD exist that can compromise missions at individual and team levels, as well as seriously impact SOF families (deployments alone can have negative effects on family members).⁵ United States Army Special Operations Soldiers are exposed to intense dangers in far-forward, austere locations. They experience relentless operations tempo between one tour of duty and the next. They work in small teams and depend heavily on each other for their mutual survival.

As such, it may be said that SOF Soldiers are the epitome of Soldiers exposed stress and trauma, to the point that after eleven years of war, the continual presence of both has been normalized. This acclimatization requires continual recognition of trauma's magnitude and after-effects: "Trauma is a measurable event in which significant amounts of damaging energy transfers to a host, causing considerable disruption to physiological, structural, or psychological integrity. Outcomes from traumatic injury include physiologic and emotional responses of varying magnitudes, but exclude those of inconsequential and negligible natures."⁶

The SOF organizational culture derives from individuals selected for stoicism and groomed to embody the warrior ethos;⁷ for this and other reasons, SOF personnel may be reluctant to seek help out of a sense of duty to their units more than from any fear of stigmatization. Unpublished studies of a similar nature to this have been performed, but this study is the first published that determines the incidence of PTSD symptoms in Soldiers assigned to United States Army Special Operations Command (USASOC) at Fort Bragg, North Carolina. The study focused on exploring possible correlations and relationships between the incidence of PTSD symptoms in this population and several factors that may demonstrate propensity for developing PTSD symptoms: major

organizational unit or Parent Command (PC), Military Occupational Specialty (MOS), Number of deployments (NOD), and Theaters of Operation (TO).

Background

Post-traumatic Stress Disorder has been shown to be a significant problem in conventional U.S. Army Soldiers deploying to Afghanistan and Iraq, with a presence of approximately 6–12%.^{8,3} Special Operations Forces are a critical component in the Global War On Terror (GWOT) campaigns in Iraq (formerly) and Afghanistan (currently), and continue to frequently deploy in overseas contingency operations (OCO). PTSD can become a debilitating mental health issue, which may prevent these highly skilled Soldiers' mission success. To date, there is no publishable data on its specific incidence in SOF, nor is there ample and reliable evidence regarding precipitating variables or risk factors for PTSD symptoms in this group.

Research on conventional U.S. military forces reveals numerous ways in which PTSD negatively impacts Soldiers, their families, and fighting strength. Neuroimaging studies on Soldiers with PTSD suggest that Soldiers with PTSD may have difficulty focusing due to inadequate recruitment of neural networks.⁹ Post-traumatic Stress Disorder negatively impacts military families.^{10–14} A study of 50 couples showed that male Vietnam veterans with PTSD symptoms were more prone to domestic violence.¹⁵ There may even be distinctive patterns of domestic violence committed by veterans with PTSD.¹⁶ A study of 120 Veterans returning from Iraq and Afghanistan found those veterans experience lower quality of life in such areas as emotional well-being, energy, general health, pain, physical functioning, and social functioning.⁸

A clinical case presentation of Operation Iraqi Freedom veterans suggested that upon returning to home from deployment, compulsive checking behavior (presumably ingrained through training and combat experiences) may be maladaptive symptoms of PTSD – a habituated way to deal with anxiety.¹⁷ A study of 406 U.S. veterans of Operation Enduring Freedom (OEF) and OIF showed increases in high-risk behavior.¹⁸ Regression analyses of 7,924 U.S. Army veterans who served in Vietnam showed that those with PTSD had higher case-fatality rates from causes including heart disease, cancer, motor vehicle accidents, accidental poisonings, suicides, and homicides.¹⁹ Similar results were echoed in another study of 4,247 Vietnam Veterans; those with PTSD had 71% higher rates of mortality than veterans without PTSD; the higher mortality was attributed to accidental poisonings, motor vehicle accidents, and suicides.²⁰

Fear of stigma is a significant barrier to care to conventional U.S. military forces.^{4,21} A study of three U.S. Army

Infantry units and one Marine Infantry unit found that personnel screening positive for functional mental health disorders were twice as likely as those who screened negative to report fear of stigmatization and other barriers to mental health care.⁴ In 2006, the U.S. military Mental Health Advisory Team IV reported that 37% of Soldiers and Marines who screened positive for mental health problems mistrusted mental health providers.²¹ Unpublished surveys of SOF personnel mirror similar behavioral health treatment concerns.

Despite military policy and doctrine stating otherwise, many individuals in SOF have concerns about career progression with a mental health diagnosis' impact on selection for military training schools (e.g., Ranger school, Combat Diver Qualification Course (CDQC), and military free fall [HALO]), evaluations for security clearances, and future unit assignments (especially when units employ an assessment and selection process). Post-traumatic Stress Disorder does not preclude or prohibit SOF personnel from advancing in their profession; however, failure to seek treatment can derail Soldiers' careers, families, and overall well-being.

Current literature suggests that combat exposure and numerous deployments may increase the risk of developing PTSD.^{3, 21–23} A recent (2001–2006) prospective cohort analysis of 50,184 U.S. military personnel showed that those exposed to combat had a three-fold increase in PTSD symptoms or diagnosis.²² Study of three Army and one Marine infantry units (2,530 pre-deployment personnel and 3,671 post-deployment Infantrymen) using an anonymous survey – incorporating the National Center for PTSD Checklist of the Department of Veterans Affairs (VA) – found that more personnel returning from Iraq, where combat exposure at that time was higher than Afghanistan, met screening criteria for major depression, generalized anxiety, or PTSD.⁴

Numbers of deployments may also contribute to elevated rates of PTSD. A retrospective analysis of 1,322 active-duty U.S. Soldiers from 2005 through 2007 indicated that when compared to Soldiers with only one deployment, the odds of screening positively for PTSD is 60–77% higher for Soldiers with two deployments.²³ Additionally, a review of 158 U.S. Army medical board records revealed that Vietnam Veterans called to deploy again to the Persian Gulf War were at significantly higher risk for developing symptoms of PTSD.²⁴ Exposure to combat, multiple deployments, and histories of serving in more than one armed conflict all appear to be reliable prognostic indicators for PTSD symptom development within the general U.S. Army population.

The extent of PTSD symptoms in U.S. Army SOF is currently unknown. We searched published evidence via

PubMed by the SOF-specific keywords including PTSD, Special Forces, military, and cognitive behavioral therapy for the periods of 1985–2010, with a gap search to March 2011, but found only one article focusing on PTSD in SF. This sole result was specific to SF Veterans of the Vietnam conflict, and determined approximately 25% of these elite veterans suffered from PTSD.²⁵ This incidence was similar to other research involving groups of Army Vietnam Veterans, and reported high reluctance in participating in research involving mental health,¹⁰ despite the authors' efforts in delivering informational meetings assuring Veterans that confidentiality was ensured. The authors concluded that the elite selection process and rigorous training received by the Special Forces Vietnam Veterans did not make them more resilient to avoiding PTSD.¹⁰ History of poor family relationships, being physically wounded, feeling guilt over friends' deaths, and difficulty communicating feelings upon returning from Vietnam were all linked to PTSD symptoms.^{10,25}

Froede defines resiliency in the military as essentially synonymous with survivability: resiliency is an adaptive response to adverse events consisting of five elements: 1) persistence [fierce determination], 2) hardiness [the ability to withstand stress with minimal negative consequences, or emerging intact from stressful situations], 3) optimism [resistance to defeating thoughts], 4) symbolic transformation of experience [the ability to find meaning in adverse events], and 5) versatility [adaptability].²⁶ Many SOF personnel participate in assessment and selection processes and are successful based on their physical performance and, we assume, resiliency.

Units incorporate tough, realistic training (stress inoculation) and pride themselves on an ethos of humility, physical fitness and mental stamina. Due to this organizational culture and evidence supporting enhanced bio-behavioral mechanisms in response to stress, many assume that SOF rates of PTSD would differ positively from their conventional counterparts.²⁷ There is evidence supporting this assumption, indicating biochemical distinctions in neuropeptide levels in SF when compared to conventional Soldiers.²⁸

Higher levels of the protein neuropeptide-Y (NPY, a neurotransmitter involved in pain perception) were found in SF Soldiers when placed under the stress of interrogations in U.S. Army survival school.^{28,29} "Stress-induced alterations of plasma NPY were significantly different in SF Soldiers compared to non-SF Soldiers. These data support the idea that NPY may be involved in the enhanced stress resilience seen in humans." Special Forces Soldiers were also less prone to experiencing dissociation compared to conventional Infantry Soldiers when exposed to stressful situations in U.S. Army survival training.³⁰

Despite this, increased levels of NPY in SF Soldiers in response to stress *assumes* that those responses correlate to Soldiers experiencing "... less *subjective* distress and remain[ing] more interactive with their environment..." (emphases ours).²⁸ Special Forces Soldiers' increased NPY levels, *subjective* evaluations of behavior during stressful interrogations, and *self-reporting* significantly fewer symptoms of mental distress all indicate the *possibility* of enhanced stress responses (again, emphases ours).²⁸ At most, these results show the biochemical and subjective differences between SF and non-SF Soldiers during a singular stressful event, but do not adequately predict the responses of SF Soldiers to prolonged, protracted, and repeated exposures to combat and life-threatening situations.

Behaviorally, these mechanisms may have a protective benefit against stress reactions, and also indicate the possibility that those selected for SF may have fewer tendencies to mentally dissociate at baseline. Neurologically, PTSD has been linked to reduced capacity for experiencing rewards; essentially, resilience to re-experiencing traumas could be enhanced in individuals with neurologically healthy and intact reward function.³¹ Neuroimaging studies of eleven SF Soldiers showed distinct patterns of robust activity in the reward centers of the brain when compared to civilians, suggesting the possibility of enhanced neurological resilience in SF.³¹ At the same time, there is evidence in humans and animals that PTSD has both biological and psychological bases, and one study is not enough to conclude that images of eleven SF Soldiers' reward centers provide significant neuroprotection from developing PTSD.^{32–42} What makes Special Forces Soldiers "special" may therefore be more of a fine balance of biological and psychological factors versus sole focus on neurological resilience or biochemical responses to stress.

Methods

Participant Recruitment

Approval to conduct this study was obtained from the USASOC Chief of Staff. Additional communications approval was obtained from U.S. Special Operations Command (SOCOM) for access to email distribution lists of all Soldiers assigned to subordinate units of USASOC. The email distribution lists were owned and maintained by USASOC and we investigators only had access for the purposes of the study. The investigators did not keep a copy of the distribution lists, nor did we have access to the names of individuals included on the distribution lists. In February of 2011, the Womack Army Medical Center Institutional Review Board approved the protocol. The study was advertised by three informational emails sent at two-week intervals from March 2011 to April 2011.

Participants

We queried 430 Soldiers assigned to seven SOF units within USASOC at Fort Bragg, North Carolina: Headquarters, United States Army Special Operations Command (HQ, USASOC)/United States Army Special Forces Command (USASFC), 3rd Special Forces Group (3rd SFG), 7th Special Forces Group (7th SFG), United States Army John F. Kennedy Special Warfare Center and School (SWCS), 95th Civil Affairs (CA) Brigade, 4th Military Information Support Group (MISG), and the 528th Sustainment Brigade (528th BDE).

Design and Methods

This is a cross-sectional study that used an anonymous Web-linked survey to collect data. An information sheet was sent to all Soldiers on the distribution list, which served as informed consent, and provided a link to the online survey website SurveyMonkey. Also included with the informed consent and information were instructions on how to correctly complete the survey. Completion of the survey implied consent. In this manner, we could ensure respondents were de-identified and could not be traced.

Email distribution lists containing email addresses and names were used to send out the survey information and follow-up reminders. The distribution lists were owned and maintained by USASOC and the investigators only had access for the purposes of the study. No copy of the distribution list was kept by the investigators. Surveys were filled out anonymously. There were no traceable links to participants. Initial data collection ceased in the summer of 2011. The study was closed in the fall of 2011. Data will be destroyed in 2014, three years after the completion of the study in accordance with Womack Army Medical Center Investigation Review Board (IRB) protocol.

Measures

The Posttraumatic Stress Disorder Checklist (PCL) is a questionnaire of PTSD symptoms consisting of 17 items and takes less than 10 minutes to complete.⁴³ The questions are derived from the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*, which is the main psychiatric reference manual, listing all diagnostic criteria for major psychiatric conditions.³ There are three versions of the PCL: PCL-C is for civilians, PCL-M is for military personnel, and PCL-S is for people who have experienced any specific traumatic event.⁴⁴ This study used the PCL-M to optimally match the study population and assessments in routine use by SOF medical providers.

PCL-M is a validated instrument using a Likert scale for quantifying intensity of symptoms from 1 ("not at all") to 5 ("extremely"). The minimum score is 17, while the maximum score is 85.⁴⁴ The PCL has a Cronbach's alpha

between 0.94 and 0.97 – Cronbach's alpha is a statistical measure of how well a test actually measures what it is supposed to measure – if a test has a Cronbach's alpha greater than 0.97, it has high reliability in psychometrics and test-retest/inter-intra-rater reliability. As such, the PCL-M meets this study's intent to measure (not diagnose) PTSD symptoms.

Sensitivity is a test's ability to detect true cases; specificity is a test's ability to reject false cases.⁴⁵ For this study, a cutoff score of 50 was used to be consistent with previous research on the general military population.^{4,5,46} The cutoff score of 50 has a sensitivity of 0.24 and a specificity of 0.98.⁴⁷ We also utilized cutoff scores of 28, which have a higher sensitivity of 0.85 and a specificity of 0.83, as determined by the U.S. Department of Veterans Affairs.^{1,47}

The PCL-M was used since it takes little time to complete and serves the intent to measure PTSD symptoms in Special Operations Soldiers. The survey consisted of all questions on the PTSD Checklist-Military Version (PCL-M), and questions regarding the following dependent variables: Parent Command (PC), Military Occupational Specialty (MOS), Number of deployments (NOD), and Theaters of Operation (TO).

Statistical Analysis

We wanted to compare the differences in scores within different populations of SOF, sorted by parent command (PC), military occupational specialty (MOS), number of deployments (NOD) (0, 1, 2, and 3+), and theaters of operation (TO). Therefore, we chose to employ descriptive statistics and One-way analysis of variance (ANOVA). Post-hoc analysis using Tukey's HSD was used for comparing variables with significance ($\leq 0.05\%$). Main effect and interaction among independent variable PCL-M and dependent variables MOS and NOD were conducted with multi-factorial analysis and post-hoc analysis. All statistical tests assumed a two-tailed level of significance ($P < 0.05$) using SPSS version 16.0 (SPSS, Inc., Chicago, IL).

Results

Cohort Characteristics

Four hundred and thirty – of a possible ten thousand – Soldiers on Fort Bragg within the Special Operations Command responded to the online survey. The three main variables – Parent Command, MOS, and Number of Deployments to Iraq, Afghanistan, Philippines, or Other – were used for descriptive analysis and comparative analysis.

Parent Command and PCL-M Results

Participants were predominantly from 95th CA (34.9%), followed by USASOC (28.6%), 3rd SFG (15.6%), and

MISG (9.5%). There was a response of less than 5% from SWCS, 7th SFG, and 528 BDE. Mean PCL-M scores for all Parent Commands were at or above the suggested cut-off severity score of 28 for diagnosis as set by the VA, with a range from 28.9 ± 13.9 to 43.18 ± 15.6 (Table 1).¹ When total symptom severity score plus questions meeting criteria for DSM-IV diagnosis of PTSD were combined (at least one item from questions 1–5; at least three items from questions 6–12, and two items from questions 13–17 rated as “Moderately” or above were counted), 20% or 16% of respondents met threshold for PTSD if using the cutoff set by the VA of (≥ 28) or that of Weathers et al. with a cutoff score of (≥ 50), respectively.^{2–5} As we stated previously, our study does not and was not designed to diagnose PTSD. PCL-M severity scores were statistically different between 7th SFG (43.2 ± 15.6) and the 95th CA (28.9 ± 13.9) and USASOC (30.9 ± 15.4); ($F(6, 423) = 4.4$, $p = 0.001$ and $p = 0.012$) (Table 2).

MOS and PCL-M Results

Stratified by MOS, the “Other” series had the highest response rate with 35.8%, followed by 11/18 series (28.4%), 38 series (27.7%), and 37 series (7.4%). Mean PCL-M scores for all MOS were above 28, with a range from 29.8 ± 15.0 to 36.2 ± 15.6 (Table 1). Post-hoc analysis to determine difference in PCL-M severity scores between the 11/18 series (35.9 ± 16.6) and 38 series (29.7 ± 15.0) was statistically significant ($F(4, 423) = 3.4$, $p = 0.015$) with a trend toward significance ($F(4, 423) = 3.4$, $p = 0.10$) between 11/18 series and those who responded as “Other” (31.3 ± 14.9) as their MOS (Table 3).

Number of Deployments, Theaters of Operation and PCL-M Results

The number of deployments (NOD) and specific theaters of operation (TO) can significantly affect the amount of combat exposure, shown to multiply increase the risks for and incidence of PTSD. Descriptive analysis of the total number of deployments with stratification by MOS reveals the 11/18 series had the most deployments at 5.8 ± 2.8 as compared to the 38 series and “others” which had 3.2 ± 2.2 and 3.2 ± 2.78 , respectively ($F(3, 423) = 14.8$, $p < 0.000$) (Tables 4 and 5).

We further tested how PCL-M scores differed based on the NOD in the context of each of the four TO: Iraq, Afghanistan, Philippines, and Other with a one-way ANOVA analysis. There was a significant increase in PCL-M severity score for NOD only to Afghanistan $p = .001$ (Table 6). After three deployments in Afghanistan, there was a significant increase in PCL-M scores as compared to 0, 1st and 2nd deployments (Table 7).

Based on the above data, we assessed the independent effects of MOS and NOD on PCL-M scores via a factorial

ANOVA. A main effect for NOD was significant ($F(1, 419) = 13.8$, $p < 0.000$); however, when combined with the type of MOS, did not affect PCL-M severity scores. Looking at the interaction between NOD and MOS was not significant ($F(3, 419) = 1.2$, $p > 0.05$) and thus did not influence PCL-M scores (Table 8).

Discussion

Despite the importance of mental readiness to the ultimate performance of SOF Soldiers, we found that little is known about PTSD incidence in this specific population. Studies not focused on Special Operations Soldiers suggest PTSD rates of 6–12%.^{8, 94} Our study focused on SOF Soldiers, and suggests that for this representative sample, conservative estimates for rates of PTSD range from 16–20%. It is important to note that a common error in the literature is the misidentification of prevalence and incidence: prevalence refers to the presence of a disease a population (usually in 100,000 people) at a particular point in time (usually a year), while incidence measures the rate of new case occurrence in a population at risk.⁴⁸

It is also important to note that higher scores or a positive screen on the PCL-M does not necessarily equate to worsening functioning; diagnosis of any mental health disorder is ultimately driven by a clinician’s assessment and social/occupational impairment. Hypotheses that SOF Soldiers are more resilient and therefore less prone to suffer impairment at home and work – even with higher scores or a positive screen on the PCL-M – warrant additional formal, rigorous study.^{49, 50}

There were no differences in PCL-M score relative to NOD to Iraq, as reported by SOF Soldiers. This may be attributed to the decreasing military presence of late, and initiatives geared more toward establishing security versus actively engaging combatants. This study does reveal that SOF Soldiers were scoring higher on the PCL-M after their third or subsequent deployments to Afghanistan, but found no differences between first and second deployments. We hypothesize that there may be training and psychological compensatory mechanisms that prime Soldiers for initial deployments, and that those mechanisms and readiness measures may decrease PTSD between deployments one and two.

Over time and chronic exposure to stress, these mechanisms may become exhausted, depleted, and then overridden by maladaptive coping mechanisms. Another possible explanation is that SOF Soldiers serving in Afghanistan may be exposed to more missions, threats, and engagement, leading to increased awareness of dangers and heightened stress responses. It would follow that it is crucial to direct more reliable, rigorous, and aggressive

Table 1 Descriptive Statistics of PCL-M scores based on Parent Command, MOS and Number of Deployments

N=430	Frequency	Mean PCLM (SD)	95% CI Lower-Upper Bounds
Parent Command			
3rd SFG	67 (15.6)	35.40 (17.48)	31.14–39.67
4th MIG	41 (9.5)	36.54 (15.64)	31.60–41.47
95th CA	150 (34.9)	28.89 (13.90)	26.65–31.14
USASOC	123 (28.6)	30.93 (15.44)	28.18–33.69
SWCS	22 (5.1)	34.45 (12.91)	28.73–40.18
528 BDE	5 (1.2)	38.20 (15.99)	18.35–58.05
7th SFG	22 (5.1)	43.18 (15.65)	35.34–51.02
MOS			
11/18 Series [§]	122 (28.4)	35.85 (16.62)	32.87–38.83
37 Series	32 (7.4)	33.16 (16.11)	27.35–38.97
38 Series	119 (27.7)	29.77 (15.04)	27.04–32.50
Other	154 (35.8)	31.34 (14.85)	28.98–33.71
Missing	3 (0.7)	—	—
Number of Deployments (Theater)			
Iraq			
0	27 (6.3)	32.06 (16.23)	29.18–34.93
1	130 (30.2)	30.62 (13.97)	28.19–33.04
2	102 (23.7)	33.35 (16.06)	30.20–36.51
3 or more	73 (17.0)	34.51 (16.82)	30.58–38.43
Missing	98 (22.8)	—	—
Afghanistan			
0	38 (8.8)	28.92 (14.38)	26.61–31.23
1	89 (20.7)	32.72 (15.94)	29.36–36.08
2	92 (21.4)	32.65 (15.10)	29.52–35.78
3 or more	98 (22.8)	36.99 (16.72)	33.64–40.34
Missing	113 (26.3)	—	—
Philippines			
0	56 (13.0)	32.35 (15.53)	30.85–33.85
1	10 (2.3)	36.00 (22.31)	20.04–51.96
2	2 (0.5)	—	—
3 or more	2 (0.5)	—	—
Missing	360 (83.7)	—	—
Other			
0	39 (9.1)	30.97 (15.06)	29.16–32.79
1	95 (22.1)	34.40 (17.40)	30.86–37.94
2	45 (10.5)	34.60 (14.19)	30.34–38.86
3 or more	24 (5.6)	35.17 (16.66)	28.13–42.20
Missing	227 (52.8)	—	—

Note: [§]11/18 Series combined for analysis of variance

Table 2 Comparison of Mean PCL-M Scores among Special Operations Forces Parent Command

(I) Parent Commands	(J) Parent Commands	Mean Difference (I-J)	Std. Error	Sig
3rd SFG	4th MIG	-1.134	3.032	1.000
	95th CA	6.510	2.247	0.083
	USASOC	4.468	2.322	1.000
	SWCS	0.948	3.757	1.000
	7th SFG	-7.779	3.757	0.819
4th MIG	3rd SFG	1.134	3.032	1.000
	95th CA	7.643	2.695	0.100
	USASOC	5.602	2.757	0.899
	SWCS	2.082	4.041	1.000
	7th SFG	-6.645	4.041	1.000
95th CA	3rd SFG	-6.510	2.247	0.083
	4th MIG	-7.643	2.695	0.100
	USASOC	-2.042	1.860	1.000
	SWCS	-5.561	3.491	1.000
	7th SFG	-14.288*	3.491	0.001
USASOC	3rd SFG	-4.468	2.322	1.000
	4th MIG	-5.602	2.757	0.899
	95th CA	2.042	1.860	1.000
	SWCS	-3.520	3.539	1.000
	7th SFG	-12.247*	3.539	0.012
SWCS	3rd SFG	-0.948	3.757	1.000
	4th MIG	-2.082	4.041	1.000
	95th CA	5.561	3.491	1.000
	USASOC	3.520	3.539	1.000
	7th SFG	-8.727	4.610	1.000
7th SFG	3rd SFG	7.779	3.757	0.819
	4th MIG	6.645	4.041	1.000
	95th CA	-14.288*	3.491	0.001
	USASOC	12.247*	3.539	0.012
	SWCS	-8.727	4.610	1.000

Note: *The mean difference is significant at 0.05 level

mental health assessment and PTSD screening – and psychological intervention – toward SOF Soldiers with more than two deployments to Afghanistan.

It is difficult to draw concrete conclusions on PTSD incidence based on parent command or MOS, given the overlapping and changing nature of these variables among individual Soldiers. Based on the data presented here, we speculate that the higher incidence of PTSD symptoms in the 18 series MOS is due to more acute, frequent, and longer exposures to combat stressors. For example, the

Table 3 Comparison of Mean PCL-M Scores among Different Special Operations Forces MOS

(I) Series	(J) Series	Mean Difference (I-J)	Std. Error	Sig
11/18	37	2.696	3.083	1.000
	38 Other	6.079* 4.508	2.000 1.881	0.015 0.102
37	11/18	-2.696	3.084	1.000
	38 Other	3.383 1.812	3.092 3.016	1.000 1.000
38	11/18	-6.079*	2.000	0.015
	37 Other	-3.383 -1.571	3.092 1.895	1.000 1.000
Other	11/18	-4.508	1.881	0.102
	37	-1812	3.016	1.000
	38	1.571	1.895	1.000

Note: *The mean difference is significant at the 0.05 level

Table 4 Descriptive Statistics of Mean Deployment Numbers among Different MOS (N = 430)

MOS	Frequency	Mean Deployment Number (SD)	95% CI Lower-Upper Bounds
11/18	122 (28.4)	5.18 (2.78)	4.68–5.68
37 Series	32 (7.4)	3.87 (3.39)	2.65–5.10
38 Series	119 (27.7)	3.21 (2.16)	2.81–3.61
Other	154 (35.8)	3.27 (2.77)	2.83–3.71

Table 5 Comparison of Mean Numbers of Deployments among Different MOS

(I) Series	(J) Series	Mean Difference (I-J)	Std. Error	Sig
11/18	37	1.30533	0.53014	0.085
	38 Other	1.97024* 1.90760*	0.34391 0.32352	0.000 0.000
37	11/18	-1.30533	0.53014	0.085
	38 Other	0.66492 0.60227	0.53153 0.51857	1.000 1.000
38	11/18	-1.97024*	0.34391	0.000
	37 Other	-0.66492 -0.06264	0.53153 0.32579	1.000 1.000
Other	11/18	-1.90760*	0.32352	0.000
	37	-0.60227	0.51857	1.000
	38	0.06264	0.32579	1.000

Note: *The mean difference is significant at the 0.05 level

11/18-series Soldiers deployed an average of five times compared to the 38-series Soldiers, who reported deploying 40% less (an average of deploying three times). No PCL-M was done previous to these Soldiers entrance

Table 6 One-way ANOVA: Analyzing the Differences between Deployment Numbers among Special Operations Forces in Different Theaters

	Sum of Squares	df	Mean Square	F	Sig.
Iraq					
Between Groups	844.14	3	281.38	1.149	0.33
Within Groups	104280.92	426	244.79		
Total	105125.06	429			
Afghanistan					
Between Groups	3906.18	3	1302.06	5.48	.001
Within Groups	101218.88	426	237.60		
Total	105125.06	429			
Philippines	—	—	—	—	—
Others					
Between Groups	522.30	3	174.10	0.71	.547
Within Groups	104602.760	426	245.55		
Total	105125.06	429			

Table 7 Comparison of PCL–M Scores and Numbers of Deployment in Afghanistan

(I) Deployments	(J) Deployments	Mean Difference (I–J)	Std. Error	Sig
0	1	–3.799	2.060	0.395
	2	–3.732	2.039	0.407
	3+	–8.069*	2.000	0.000
1	0	3.799	2.060	0.395
	2	0.067	2.292	1.000
	3+	–4.271	2.257	0.355
2	0	3.732	2.039	0.407
	1	–0.067	2.292	1.000
	3+	–4.338	2.238	0.319
3+	0	8.069*	2.000	0.000
	1	4.271	2.257	0.355
	2	4.338	2.238	0.319

Note: *The mean difference is significant at the 0.05 level

to their parent command or MOS, making it difficult to estimate incidence prior to serving in SOF. We discovered that certain MOS's had more deployments than others, but MOS and number of deployments did not appear to have collaborative effects on PTSD scores. A multifactorial ANOVA with post-hoc analysis showed that more deployments increase the likelihood of PTSD symptoms independently of MOS. Deployment number and MOS appear to be two important but independent factors for PTSD symptoms, but we assert that this relationship warrants further exploration.

Table 8 Tests of Between-Subjects Effects of NOD and MOS on mean PCL–M Scores

Source	Type III Sum Squares	df	Mean Square	F	Sig
Corrected Model	6297.864 [§]	7	899.695	3.843	0.000
Intercept	81083.768	1	81083.768	346.326	0.000
Number Deployed*	3248.909	1	3248.909	13.877	0.000 [§]
MOS**	419.719	3	139.906	0.598	0.617
Number Deployed MOS	784.159	3	261.386	1.116	0.342
Error	98098.576	419	234.15		
Total	550715.000	427			
Corrected Total	104396.440	426			

Notes: [§]R Squared = 0.60 (Adjusted R Squared = 0.45)

*Number deployed = 0,1,2,3 or more total deployed to include Iraq, Afghanistan, Philippines and others

**MOS = 11/18, 37, 38, other series

[§]Significant at the 0.05 level

Conclusions and Recommendations

The possibility for increased incidence of PTSD symptoms in Special Operations Soldiers when compared to the general military population should alert our SOF clinicians to reject complacency or the assumption that SOF Soldiers are somehow more immune to stress reactions. The stereotype of the SOF Soldier is one of physical and mental resiliency, forged through selection and intensive training. While that is overall an accurate description, SOF Soldiers are repeatedly exposed to extreme threats. There may be a tendency for SOF Soldiers to tell their Battalion Surgeon, Team Medic (18D), or even Soldier Readiness Center (SRC) provider that “I’m alright” when the reverse is true. There may also be a tendency for teammates and spouses to refrain from intervening when they know a Soldier is suffering; they have known that Soldier for years, and may fear that stigma will impact career progression, security clearances, or future assignments.

Medical providers must take note and educate Soldiers and spouses in order to optimize catchment, reduce stigma, and prevent worsening symptoms that lead to serious mental health and wellness issues. Providers also need to take note when SF Soldiers move off their team to a staff (Battalion, Group or higher) or cadre position (e.g. SWCS). After being on teams for many years, many are “promoted off” (thus the reason many senior NCOs anecdotally report why they attend the Special Forces Warrant Officer Course- to return to the team and life that they know, even though it almost guarantees combat exposure). Again, based on SF Soldiers’ anecdotal

reports, they have indicated that moving to a staff or cadre position not only decreases the presence of protective cohesion they previously received from their team or group, but can also cause a sense of lack of purpose. No longer serving at the “tip of the spear” – part of their military identity for many years – can combine with a new assignments’ stress and “downtime” with family (which Soldiers can find as stressful as combat). All can increase stress, worsen PTSD symptoms, or cause what was post-traumatic stress (PTS) to morph into PTSD.

With the withdrawal of troops from Iraq and current emphasis on national stability-building operations in Afghanistan, the SOF medical community must be even more vigilant in light of our study’s results demonstrating that multiple deployments to Afghanistan may accumulate mentally, having an effect on PTSD symptoms. Special Operations Soldiers often deploy more frequently than the conventional army, with shorter periods to renew and regroup while in garrison. This rapid operational tempo takes its toll on the resiliency of our SOF Soldiers, in what we believe to be in the form of increased PTSD symptoms.

Limitations

Unfortunately, not all of the 10,000 SOF Soldiers at Fort Bragg were notified via email. This limited participation in our study. The study also had the potential for respondent bias. We speculate that SOF personnel with PTSD symptoms might be more or less inclined to have responded to our survey due to evidence suggesting increased suspicion of stigma, thereby skewing the results. Furthermore, the results may have been limited by the phenomenon of survey overload; in the electronic mail era, Soldiers are frequently asked to complete surveys.

During times of high operations tempo, Soldiers might be inclined to hit the “delete” button when approached with another survey, especially with the appearance of each successive reminder. Deployed Soldiers may be otherwise occupied and therefore unable to respond, or there may be a lack of internet connectivity. This makes data capture inherently difficult. As a result, the study had insufficient power to reliably complete comparison tests on Soldiers with varying numbers of combat deployments. Moreover, because of proportionately unequal unit responses, PTSD symptoms could not be responsibly compared between units. Also of note, the study had insufficient power to do a t-test to explore significant statistical differences between zero and one deployment, and one and two deployments. Another problem with surveying currently deployed Soldiers is that the results of the survey may reflect responses to ongoing threats, rather than consequences or compounded sequelae of past traumatic events.⁵¹

Although this study is the first of its kind to focus strictly on SOF, previous studies on PTSD may have inadvertently included SOF in addition to studying conventional forces. Further work is needed ensure pure catchment of conventional Army Soldiers for comparison to SOF. The study by Erbes et al. did not specify whether any Soldiers were SOF. Therefore, it is unknown whether his PTSD prevalence rate of 6–12% was appropriately reflective of conventional or unconventional Soldiers.⁸

Currently, it is impossible to predict how closely this data defines the USASOC community as a whole. Due to smaller sample sizes within the differing variable categories, comparison tests could not be performed for Soldiers with varying numbers of combat deployments. It is estimated that a sample size of 171 respondents for each deployment number would be needed for comparison tests of Soldiers with varying numbers of combat deployments. Therefore, we were not able to specifically determine the correlation between PTSD symptoms in SOF and deployment experiences. Furthermore, the optimal cutoff point for the PCL is variable depending on the clinical context and designating authority, i.e., the VA or the Department of Defense (DoD).⁵²⁻⁵⁵

In this study, we used cutoff points of 28 and 50, because the optimal cutoff point for SOF Soldiers has not been determined by SOF-specific research. An additional caveat for future study and determining cutoff scores references Holcomb, Gaylord et al.’s 2008 study of PTSD in the military. Future research initiatives should consider that their study utilized a PCL-M score cut-off at 44: “It is important to note that lowering the cut-off score to 44 (previously recommended as 50), overall diagnostic efficiency is improved to 0.90, yielding a sensitivity of 0.778, a specificity of 0.864, and correctively identifies 17 of 18 participants with PTSD.”⁵⁶

On that note, it is important to highlight that we will never determine the optimal PTSD cutoff score for the SOF population; in order to know the optimal cutoff points based on specific variables, leadership and clinicians need to champion interdisciplinary research initiatives within SOF and SF, including expanding this study to rigorously define measurements and to determine the actual incidence of PTSD in our SOF Soldiers.^{57, 58}

In attempts to assess correlations or relationships between PTSD symptoms in SOF Soldiers and deployment experience, respondents were not asked for their total time deployed in months. This may prove to be an important predictor of PTSD symptoms severity in SOF Soldiers.⁵⁹ A SOF Soldier could have deployed to fewer locations than another Soldier, yet he or she may have been deployed for a longer total duration. For example, a SOF Soldier with nine deployments may have been deployed for a total of thirty months (two to three

Example of an Online USASOC PTSD Survey

	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Read each symptom, then place an X in the box to answer how much you have been bothered by it in the past month.					
Repeated, disturbing memories, thoughts, or images of a stressful military experience from the past?					
Repeated, disturbing dreams of a stressful military experience from the past?					
Suddenly acting or feeling as if a stressful military experience were happening again (as if you were reliving it)?					
Feeling very upset when something reminded you of a stressful military experience from the past?					
Having physical reactions (for example: heart pounding, trouble breathing, or sweating) when something reminded you of a stressful military experience from the past?					
Avoid thinking about or talking about a stressful military experience from the past or avoid having feelings related to it?					
Avoid activities or situations because they remind you of a stressful military experience from the past?					
Trouble remembering important parts of a stressful military experience from the past?					
Loss of interest in things that you used to enjoy?					
Feeling distant or cut off from other people?					
Feeling emotionally numb or being unable to have loving feelings for those close to you?					
Feeling as if your future will somehow be cut short?					
Trouble falling or staying asleep?					
Feeling irritable or having angry outbursts?					
Having difficulty concentrating?					
Being "super alert" or watchful on guard?					
Feeling jumpy or easily startled?					
2. What is your MOS?					
11 Series					
18/180 Series					
37 Series					
38 Series					
Other (please specify)					
3. Parent Command					
Parent Unit					
<i>Options:</i> 3rd Special Forces Group 7th Special Forces Group 95th Civil Affairs Brigade 4th Military Information Support Group Special Warfare Center and School USASOC/USASFC 528th Sustainment Brigade					
What is your parent command? Please circle.					
	Afghanistan	Iraq	Philippines	Other	
4. How many combat tours have you served in the following theaters? (Consider a combat tour as 3 or more months in duration)					

months at a time) where as his or her counterpart may have four deployments that total to three years (nine to fifteen months at a time).⁵⁹

It is possible that the timing of certain deployments (for example, deploying during a specifically hellish time during OEF's history) may be more significant to PTSD symptoms, but the survey did not ask respondents the timeframes of their various deployments. Also, our study employed a survey based on DSM-IV criteria, when there may be more accurate models emerging that better identify and represent PTSD symptoms assessment structures.⁶⁰⁻⁶²

Further Study

In the future, this research team plans to expand the study to SOF units on other major military installations. Survey respondents will be asked about months deployed, in addition to numbers of deployments, to better grasp the gestalt of deployment lengths and variances in relation to PTSD scores. Respondents will also be asked for the year or specific months they were deployed to various locations. Further study of PTSD symptoms in SOF will be, we believe, critical to raising awareness at all levels of leadership and command, and hopefully reducing stigma. A longer survey should be employed further analyze variances and determine relationships. This should provide better data, required by commanders to make best-informed decisions. Once PTSD in SOF is best understood, newer treatments can be developed to target this unique population.⁶³⁻⁶⁷ It may be the case that SOF Soldiers with subclinical PTSD symptoms (meeting only some criteria for PTSD yet still suffering from functional impairment at work and home) may still benefit from therapy, and future studies are needed to most accurately identify these Soldiers.⁶⁸⁻⁶⁹

Future initiatives should also explore comorbid psychiatric conditions like depression and physiologic injury like traumatic brain injury (TBI) which could be responsible for some of the debilitating mental health consequences experienced by this population.^{39,70-72} Clinical providers in the SOF community are the human performance subject matter experts within their units, and we are responsible for maintaining the optimal physical and mental potential of our warriors. We must reject assumptions about our Soldiers, have a greater situational awareness of PTSD within SOF, and utilize better methodologies for assessing this segment of the military population, which operates unconventionally and directly in harm's way.

References

1. U.S. Department of Veterans Affairs. Using the PTSD Checklist (PCL). VA National Center for PTSD. [Online] June 2010. [Cited: February 15, 2012.] <http://www.ptsd.va.gov>.
2. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Edition 4. 1994.
3. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. Jul 1, *N Engl J Med*. 351(1), pp. 13–22.
4. Weathers, Frank W., et al. The PTSD Checklist (PCL): Reliability, Validity, and Diagnostic Utility. [Online] October 1993. [Cited: March 10, 2012.] http://www.pd-health.mil/library/downloads/PCL_sychometrics.doc.
5. Lester, Patricia et al. (2010). The long war and parental combat deployment: Effects on military children and at-home spouses. Takoma: *Journal of the American Academy of Child and Adolescent Psychiatry*. 49(4).
6. Froede, K. (2011). "Soldiers Can Take It" – A Conceptual Analysis of Trauma. *Journal of Special Operations Medicine*. 11(1):18–22.
7. Froede K. (2011). Underneath the unconventional: philosophies & paradigms of Special Operations Forces clinical science. *Journal of Special Operations Medicine*. 11(3):56–60.
8. Erbes C, Westermeyer J, Engdahl B, Johnsen E. (2007). Post-traumatic stress disorder and service utilization in a sample of service members from Iraq and Afghanistan. Apr, *Military Medicine*. 172(4):359–63.
9. Shaw ME, Moores KA, Clark RC, McFarlane AC, Strother SC, Bryant RA, Brown GC, Taylor JD. (2009). Functional connectivity reveals inefficient working memory systems in post-traumatic stress disorder. s.l.: *Epub*, Jun 30, 172(3):235–41.
10. Roy, Michael J. et al. (2012). Web-based post-traumatic stress disorder education for military family members. 3:384, Bethesda. *Military Medicine*. Vol. 177.
11. McGrane, Madeline. (2011). Post-traumatic stress disorder in the military: The need for legislative improvement of mental healthcare for veterans of Operation Iraqi Freedom and Operation Enduring Freedom. s.l.: *Journal of Law and Health*. Vol. 24.
12. Dekel, Rachel and Monson, Candice M. Ramat Gan. (2010). Military-related post-traumatic stress disorder and family relations: Current knowledge and future directions. *Aggression and Violent Behavior*. Vol. 15.
13. Monson, Candice M., Taft, Casey T. and Fredman, Stefany J. Toronto. (2009). Military-related PTSD and intimate relationships: From description to theory-driven research and intervention development. *Clinical Psychology Review*. Vol. 29.
14. Campbell, Arole L. and Brown, Elissa J. and Leonore Okwara. (2011). Addressing sequelae of trauma and interpersonal violence in military children: A review of the literature and case illustration. Norfolk. *Cognitive and Behavioral Practice*. Vol. 18.
15. Byrne CA, Riggs DS. (1996). The cycle of trauma; relationship aggression in male Vietnam veterans with symptoms of posttraumatic stress disorder. Fall *Violence Vict*. 11(3):213–25.
16. Finley, Erin P. et al. (2010). Patterns and perceptions of intimate partner violence committed by returning veterans with post-traumatic stress disorder. San Antonio. *Journal of Family Violence*. Vol. 25.
17. Tuerk PW, Grubaugh AL, Hamner MB, Foa EB. (2009). Diagnosis and treatment of PTSD-related compulsive checking behaviors in veterans of the Iraq war: The

- influence of military context on the expression of PTSD symptoms. July. *Am J Psychiatry*. 166(7);762–7.
18. Widome, Rachel et al. (2011). Post-traumatic stress disorder and health risk behaviors among Afghanistan and Iraq war veterans attending college. Minneapolis. *American Journal of Health Behavior*. 35(4).
19. Boscarino, JA. (2006). Posttraumatic stress disorder and mortality among U.S. Army veterans 30 years after military service. s.l: Epub, Apr. *Ann Epidemiol*. 16(4):248–56.
20. Bullman TA, Kang HK. (1994). Posttraumatic stress disorder and the risk of traumatic deaths among Vietnam veterans. 11, Nov. *J Nerv Ment Dis*. 182:604–10.
21. Report, Mental Health Advisory Team (MHAT) IV. MHAT IV Operation Iraqi Freedom 05–07 Final Report. U.S. Department of the Army. Washington, DC: Office of the Surgeon General, November 17, 2006.
22. Smith TC, Ryan MA, Wingard DL, Slymen DJ, Sallis JF, Kritz-Silverstein D and Team. (2008). New onset and persistent symptoms of post-traumatic stress disorder self reported after deployment and combat exposures; prospective population based U.S. military cohort study. *Millennium Cohort Study*. 7640, s.l: Epub, Feb 16. *BMJ*, 336:366–71.
23. Reger MA, Gahm GA, Swanson RD, Duma SJ. (2009). Association between number of deployments to Iraq and mental health screening outcomes in U.S. Army Soldiers. s.l: Epub, Aug 11. *J Clin Psychiatry*. 70(9):1266–72.
24. McCarroll JE, Fagan JG, Hermesen JM, Ursano RJ. (1997). Posttraumatic stress disorder in U.S. Army Vietnam veterans who served in the Persian Gulf War. Nov. *J Nerv Ment Dis*, 185(9):682–5.
25. Chemtob CM, Bauer GB, Neller G, Hamada R, Glisson C, Stevens V. (1990). Post-traumatic stress disorder among Special Forces Vietnam veterans. Jan. *Mil Med*, 155(1):16–20.
26. Froede, K. (2007). Conceptual Analysis of Resiliency. New Orleans: LA: Loyola University New Orleans.
27. Grills-Tauchel, Arnie E. and Littleton, Heather L., Asxom, Danny. (2011). Social support, world assumptions, and exposure as predictors of anxiety and quality of life following a mass trauma. Houston. *Journal of Anxiety Disorders*. Vol. 25.
28. Morgan CA 3rd, Wang S, Southwick SM, Rasmusson A, Hazlett G, Hauger RL, Charney DS. (2000). Plasma neuropeptide-Y concentrations in humans exposed to military survival training. May 15. *Biol Psychiatry*. 47(10):902–9.
29. Bowers, Mallory E., Choi, Dennis C. and Ressler, Kerry J. (2012). Neuropeptide regulation of fear and anxiety: Implications on cholecystokinin, endogenous opioids, and neuropeptide Y. s.l: *Physiology and Behavior*. Vol. doi: 10.1016/j.physbeh.2012.03.004.
30. Morgan CA 3rd, Hazlett G, Wang S, Richardson EG Jr, Schnurr P, Southwick SM. (2001). Symptoms of dissociation in humans experiencing acute, uncontrollable stress: A prospective investigation. Aug 8. *Am J Psychiatry*. 158: 1239–47.
31. Vythilingam M, Nelson EE, Scaramozza M, Waldeck T, Hazlett G, Southwick SM, Pine DS, Drevets W, Charney DS, Ernst M. (2009). Reward circuitry in resilience to severe trauma: An fMRI investigation of resilient Special Forces Soldiers. s.l: Epub, Feb 24. *Psychiatry Res*. 172(1):75–7.
32. Stam, Rianne. (2007). PTSD and stress sensitisation: A tale of brain and body – Part 2: Animal models. Utrecht. *Neuroscience and Biobehavioral Reviews*. Vol. 31.
33. Jovanovic, Tanja et al. (2012). Impaired safety signal learning may be a biomarker of PTSD. s.l: *Neuropharmacology*. Vol. 62.
34. Aupperle, Robin et al. (2012). Executive function and PTSD: Disengaging from trauma. La Jolla. *Neuropharmacology*. Vol. 62.
35. Acheson, Dean T., Gresack, Jodi E. and Risbrough, Victoria B. (2012). Hippocampal dysfunction effects on context memory: Possible etiology for posttraumatic stress disorder. La Jolla. *Neuropharmacology*. Vol. 62.
36. Fernandez, Manuel et al. (2001). Brain function in a patient with torture related post-traumatic stress disorder before and after fluoxetine treatment: a positron emission tomography provocation study. Uppsala. *Neuroscience Letters*. Vol. 297.
37. Hunter, Michael et al. (2011). Lateralized abnormalities in auditory M50 sensory gating and cortical thickness of the superior temporal gyrus in post-traumatic stress disorder: Preliminary results. Albuquerque. *Psychiatry Research: Neuroimaging*. Vol. 191.
38. Gold, A. L. et al. (2011). Decreased regional cerebral blood flow in medial prefrontal cortex during trauma-unrelated stressful imagery in Vietnam veterans with post-traumatic stress disorder. Boston. *Psychological Medicine*. Vol. 41.
39. Kaplan, G.B. and Vaterling, J.J. and P.C. (2010). Vedak. Brain-derived neurotrophic factor in traumatic brain injury, post-traumatic stress disorder, and their comorbid conditions: role in pathogenesis and treatment. Boston. *Behavioural Pharmacology*. 21(5–6).
40. Malashenko, O. and Laskov, V.S. and A.V. Rogosov. (2010). Neurological changes in military personnel with post-traumatic stress disorders. s.l: *Neuroscience and Behavioral Physiology*. 40(5). ISSN: 0097-0549.
41. Rusiecki, J.A. et al. (2012). DNA methylation in repetitive elements and post-traumatic stress disorder: A case-control study of U.S. military servicemembers. Bethesda. *Epigenomics*. 4(1). ISSN: 1750–192X.
42. Ehring, Thomas et al. (2008). Do acute psychological and psychobiological responses to trauma predict subsequent symptom severities of PTSD and depression? De Crespigny Park. *Psychiatry Research*. Vol. 161.
43. Engel, Charles C. (2008). RESPECT-Mil: Feasibility of a systems-level collaborative care approach to depression and post-traumatic stress disorder in military primary care. Bethesda. *Military Medicine*. 173(10).
44. International Society for Traumatic Stress Studies. Post-traumatic Stress Disorder Checklist (PCL). International Society for Traumatic Stress Studies. [Online] ISTSS, 2010. [Cited: August 18, 2010.] <http://www.istss.org/AM/Template.cfm?Section=ResourcesforClinicians&Template=/CM/ContentDisplay.cfm&ContentID=1520>.
45. Walker, Edward A. and Newman, Elana, Dobie, Dorcas J, Ciechanowski Paul, and Katon, Wayne. (2002). Validation of the PTSD checklist in an HMO sample of women. s.l: *General Hospital Psychiatry*, 24:375–380.
46. Forbes, David and Creamer, Mark and Dirk Biddle. (2001). The validity of the PTSD checklist as a measure of symptomatic change in combat-related PTSD. Melbourne. *Behaviour Research and Therapy*. Vol. 39.

47. Bliese, Paul D, Wright, Kathleen M. and Cabrera, Oscar, Castro, Carl A., and Hoge, Charles W. (2008). Validating the primary care posttraumatic stress disorder screen and the posttraumatic stress disorder checklist with Soldiers returning from combat. *Journal of Consulting and Clinical Psychology*. 76(2):272–281. Public domain.
48. Information Point: Incidence and Prevalence. Roe B & Doll H. J Clinical Nursing, 9, 178–188. Retrieved 28 August 2012 from http://www.blackwellpublishing.com/specialarticles/jcn_9_188.pdf.
49. Bartone P, Roland R, Picano J, Williams T. (2008). Psychological hardiness predicts success in U.S. Army Special Forces candidates. *International Journal of Selection & Assessment*. [serial online]. 16(1):78–81.
50. Bates M, Bowles S, Burbelo G, et al. (2010). Psychological Fitness. *Military Medicine* [serial online]. August 3. 21–38.
51. Hoffman, Yaakov S.G. and Diamond, Gary M., and Joshua D. Lipsitz. Ramat Gan. (2011). The challenge of estimating PTSD prevalence in the context of ongoing trauma: The example of Israel during the Second Intifada. *Journal of Anxiety Disorders*. Vol. 25.
52. Dobie, Dorcas J. et al. (2002). Screening for post-traumatic stress disorder in female Veteran's Affairs patients: validation of the PTSD checklist. s.l: *General Hospital Psychiatry*. Vol. 24.
53. Yeager, Derik E. et al. (2007). Performance characteristics of the posttraumatic stress disorder checklist and SPAN in Veterans Affairs primary care settings. Charleston. *General Hospital Psychiatry*. Vol. 29.
54. Blanchard, Edward B. et al. (1996). Psychometric Properties of the PTSD Checklist (PCL). New York. *Behaviour Research and Therapy*. 34(8).
55. Lang, Ariel J. et al. (2012). Abbreviated PTSD Checklist (PCL) as a guide to clinical response. San Diego. *General Hospital Psychiatry*.
56. Gaylord K, Cooper DB, Mercado JM, Kennedy J, Yoder L, Holcomb, J. (2008). Incidence of posttraumatic stress disorder and mild traumatic brain injury in burned service members: preliminary report. *J Trauma*. 64:S200-S206.
57. McDonald, Scott D. and Patrick S. Calhoun. (2010). The diagnostic accuracy of the PTSD checklist: A critical review. Richmond. *Clinical Psychology Review*. Vol. 30.
58. Richardson, Lisa K. and Frueh, Christopher and Ronald Acierno. (2010). Prevalence estimates of combat-related post-traumatic stress disorder: critical review. Hilo. *Australian and New Zealand Journal of Psychiatry*. Vol. 44.
59. Pierce, Penny F, Lewandowski-Romps, Lisa and Silver-schanz, Perry. (2011). War-Related Stressors as Predictors of Post-Deployment Health of Air Force Women. Ann Arbor. *Women's Health Issues*. Vol. 20(4S).
60. Morina, Nexhmedin, et al. (2011). The structure of post-traumatic stress symptoms in young survivors of war. Amsterdam. *Psychiatry Research*. Vol. 186.
61. Rosen, R.C. et al. (2011). Project VALOR: design and methods of a longitudinal registry of post-traumatic stress disorder (PTSD) in combat-exposed Veterans in the Afghanistan and Iraqi military theaters of operations. Watertown. *International Journal of Methods In Psychiatric Research*. 21(1). ISSN: 10498931.
62. Amdur, Richard L. and Israel Liberzon. (2001). The structure of posttraumatic stress disorder symptoms in combat veterans: A confirmatory factor analysis of the impact of event scale. Ann Arbor. *Journal of Anxiety Disorders*. Vol. 15.
63. Bomyea, Jessica and Lang, Ariel J. (2012). Emerging interventions for PTSD: Future directions for clinical care and research. La Jolla. *Neuropharmacology*. Vol. 62.
64. McLay, Robert N. et al. (2011). A randomized, controlled trial of virtual reality-graded exposure therapy for post-traumatic stress disorder in active duty servicemembers with combat-related post-traumatic stress disorder. Naval Medical Center San Diego. *Cyberpsychology, Behavior, and Social Networking*. Vol. 14(4).
65. Strachan, Martha et al. (2011). An integrated approach to delivering exposure-based treatment for symptoms of PTSD and depression in OIF/OEF veterans: preliminary findings. Charleston. *Behavior Therapy*. Vol. 10.1016/j.beth.2011.03.003.
66. Cameron, Amy and Palm, Kathleen and Victoria Follette. (2010). Reaction to stressful life events: What predicts symptoms severity? Worcester. *Journal of Anxiety Disorders*. Vol. 24.
67. Khoo, Andrew and Dent, Michael T. and Tian P.S. Oei. (2011). Group cognitive behaviour therapy for military service-related post-traumatic stress disorder: effectiveness, sustainability and repeatability. s.l: *Australian & New Zealand Journal of Psychiatry*. 45(8).
68. Bryant, R. A. (1996). Predictors of post-traumatic stress disorder following burns injury. Sydney. *Burns*. 22(2).
69. Rona, Roberto J. et al. (2008). The impact of posttraumatic stress disorder on impairment in the UK military at the time of the Iraq war. London. *Journal of Psychiatric Research*. Vol. 43.
70. Momartin. (2004). Comorbidity of PTSD and depression: Associations with trauma exposure, symptom severity and functional impairment in Bosnian refugees resettled in Australia. Sydney. *Journal of Affective Disorders*. Vol. 80.
71. Elhai, Jon D. et al. (2011). Exploring the relationship between underlying dimensions of posttraumatic stress disorder and depression in a national, trauma-exposed military sample. s.l: *Journal of Affective Disorders*. Vol. 133.
72. Pittman, James O. et al. (2012). Post-traumatic stress disorder, depression, and health-related quality of life in OEF/OIF veterans. San Diego. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care & Rehabilitation*. Vol. 21(1). ISSN:0962-9343.

MAJ (Dr) Matthew Hing is the Battalion Surgeon for 4th Battalion, 3rd Special Forces Group at Fort Bragg, NC.

MAJ (Dr) Jorge L. Cabrera is a Family Medicine staff physician with Madigan Army Medical Center at Fort Lewis, WA.

MAJ (Dr) Craig Barstow is the Battalion Surgeon for 2nd Battalion, 3rd Special Forces Group at Fort Bragg, NC.

COL (Dr) Robert Forsten is the Commander of 121st Combat Support Hospital, Commander of Brian Allgood Army Community Hospital, and Deputy Commander of the U.S. Army Medical Department Activity in Korea.