

Self-Reported Combat Stress among Troops Deployed to Iraq and Afghanistan: An Epidemiological Study

LCDR Mark S. Riddle, CDR John W. Sanders

U.S. Naval Medical Research Unit No. 3

Cairo

EGYPT

riddlem@namru3.med.navy.mil

CPT James J. Jones

U.S. Army Forces Central Command

Troop Medical Clinic

Doha

QATAR

CAPT Schuyler C. Webb

U.S. Navy Bureau of Medicine

and Surgery

Washington, DC

USA

ABSTRACT

Evident mental health needs among combat veterans following their return from operations in Iraq and Afghanistan have been described. To our knowledge, no data are available describing the mental health status of military personnel during these deployments. We report data collected from personnel systematically selected from current combat regions participating in a rest & recuperation (R&R) program in Doha, Qatar. During R&R in-briefs, mandatory completion of a clinic screening survey designed to identify individuals who may need medical treatment was conducted. Incidence of combat stress indicators are described and evaluated for relative differences by, country, rank and calendar time. Overall, 40,620 troops completed a clinic screening form between October 2003 and January 2005. Of these, active duty military personnel from Iraq accounted for 60.1% (n=24,428) of the population, and 13.7% were from Afghanistan (n=5,569). The remainder of troops which reported their unit of assignment were from Uzbekistan (n=337) or other various countries in the region (n=138). Rates of self-reported depression among those in Afghanistan were lower than those of troops from Iraq (32.3 vs. 69.7 per 10,000, $p<0.0001$). Feelings of depression and self-harm were inversely correlated with rank (4-level ordinal grouping) ($\beta_{\text{Coef}} = -0.21$, $p=0.0006$, $\beta_{\text{Coef}} = -0.49$, $p<0.00001$, respectively). Preference for seeing a chaplain trended towards a positive correlation with rank ($\beta_{\text{Coef}} = 1.24$, $p=0.13$). There were distinct temporal trends found in reported combat stress rates over time which appeared to match the rate or number of deaths reported in the country during the same period. For self-reported depression in Iraq, the rate during May 2004 was higher than other months and was preceded by a month ("Bloody April") where troops experienced high fatality rates. Similarly, for Afghanistan while more variable, there appears to be a positive association between rates of self-reported depression and numbers of reported fatalities during that month. These data support previous reports of higher mental health problems among troops in Iraq compared to Afghanistan and lower healthcare seeking behavior overall. Greater risk among lower ranks and during months following heavy combat are evident. In an effort to remove recognized barriers to care and minimize combat stress effects, we believe it is critical to recognize mental health needs and initiate services during combat deployments.

Riddle, M.S.; Sanders, J.W.; Jones, J.J.; Webb, S.C. (2006) Self-Reported Combat Stress among Troops Deployed to Iraq and Afghanistan: An Epidemiological Study. In *Human Dimensions in Military Operations – Military Leaders' Strategies for Addressing Stress and Psychological Support* (pp. 31-1 – 31-8). Meeting Proceedings RTO-MP-HFM-134, Paper 31. Neuilly-sur-Seine, France: RTO.
Available from: <http://www.rto.nato.int/abstracts.asp>.

Report Documentation Page			Form Approved OMB No. 0704-0188		
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 01 APR 2006		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Self-Reported Combat Stress among Troops Deployed to Iraq and Afghanistan: An Epidemiological Study				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Naval Medical Research Unit No. 3 Cairo EGYPT				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES See also ADM001955., The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 8	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

1.0 INTRODUCTION

Combat stress has always been a part of military history and military medicine, only the names have changed. At the onset of WWI, there was no general consensus as to the etiology of a new disorder seen on the battle field. This new malady was coined “shell shock” by a British Army physician who believed that this debilitating disorder was a result of exploding artillery shells creating nerve damage (Shepard, 2001). Although discovered to be a psychological reaction to extreme stress, the name remained. By WWII and Korea War, the term “battle fatigue” or “combat fatigue” was utilized by the military and it was agreed upon to be psychological in nature [1]. As Swank and Marchland recorded in their investigations into battle fatigue and crack-ups among Allied soldiers in WWII, after an average of fifty days' severe combat the great majority of soldiers

...[soldiers] lost their ability to distinguish the different noises of combat ... They became easily startled and confused and became tense. They were irritable, frequently “blew their tops”, over-responded to all stimuli ... This state of hyper-reactivity was followed insidiously by another group of symptoms referred to as “emotional exhaustion”. The men became dull and listless, mentally and physically retarded, pre-occupied and unable to remember details. This was accompanied by indifference and apathy ... In such cases bizarre contradictory behavior could occur.

To date, evident mental health needs among combat veterans following their return from operations in Iraq and Afghanistan have been described [2, 3] and a single study has reported on psychiatric medical evacuations from the current theatre.[4] However, to our knowledge, no data are available describing the combat stress of military personnel during these deployments and potential determinants thereof. In order to evaluate and describe combat stress among troops deployed in current combat operations we chose to describe health screening data collected from personnel systematically selected from current combat regions participating in a rest & recuperation program (R&R) in Doha, Qatar.

2.0 METHODS

The U.S. military systematically selects deployed units within Iraq, Afghanistan, Kuwait, and other countries within the region to take part in a four-day Rest and Recuperation (R&R) leave program located at a number of sites including Camp As Sayliyah in Doha, Qatar. During troop in-processing, a mandatory completion of a clinic screening form designed to identify individuals who may need medical treatment is conducted. In addition to questions regarding current or recent experience of diseases syndromes and injury, four questions are asked about current mental health problems (“Do you feel depressed?”, “Do you feel like hurting yourself?”) and preference for consultation with a mental health provider or a chaplain. In addition, the survey form included demographic information, military unit (from which country was derived), rank, and current medications. Additional data on monthly rates and counts of deaths among forces in Iraq and Afghanistan were obtained and used to evaluate temporal associations of these events with combat stress indicators.[5]

We conducted descriptive analysis on these data collected from active duty (AD) troops participating in R&R from October 1, 2003 to January 31, 2005. Differences between categorical variables were tested using Chi-square or Fisher's exact test. Poisson regression was used to estimate rates of self-reported mental health measures and evaluate differences due to potential predictor variables of country, rank and calendar month.

Multivariate Poisson regression was used to assess for confounding and report incident rate ratios for primary predictors based on each of the outcomes.

All data was double entered into Epi-Info version 6. Stata V9 (College Station, TX) was used for all analyses. Statistical significance was two-tailed and set at $p < 0.05$ for each analysis. This study was conducted on de-identified data which was collected for a primary clinical purpose and thus was exempt from the requirement for Institutional Review Board approval.

3.0 RESULTS

Overall, 40,620 troops completed a clinic screening form between October 2003 and January 2005. Of these, troops from Iraq accounted for 60.1% ($n=24,428$) of the population, and 13.7% were from Afghanistan ($n=5,569$). The remainder of troops were from Uzbekistan ($n=337$) or other various countries in the region ($n=138$). Twenty-five percent ($n=10,148$) of troops failed to complete the unit of assignment field on the clinic screening form. Troops not reporting unit of assignment were of lower rank compared to those that did complete the field (64.5% vs. 55.3%, $p < 0.0001$) and based on the population from which the R&R program draws from were considered to be from Iraq or Afghanistan. Based on these data and the primary objectives of this study [combat stress], we chose to conduct analysis on the 40,145 (98.8%) of troops reporting to be from Iraq, Afghanistan and those not stating a country assignment.

Table 1: Characteristics of combat stress indicators among US military personnel from Middle East Region, Oct 2003 – Jan 2005 (N=40,145)

Characteristic	Response Rate, # per 10,000 person-surveys			
	Feel Depressed	Feel Like Harming Self	See Mental Health Provider	See Chaplain
COUNTRY				
Iraq ($n = 24,428$)	69.7	7.8	8.2	10.7
Afghanistan ($n=5,569$)	32.3	3.6	3.6	9.0
Not stated ($n=10,148$)	92.8	4.9	7.9	13.8
TOTAL	70.3	6.5	7.5	11.2
(Poisson 95% C.I.)	(62.4 – 79.0)	(4.2 – 9.5)	(5.0-10.7)	(8.2 – 15.0)
RANK				
E1 - E4	75.5	8.3	8.7	9.6
E5 - E6	76.8	5.2	5.2	11.2
E7 - E9	51.4	0	9.3	14.0
Officer/CWO	28.4	3.2	6.3	18.9

Table 1 describes the reported rate of responses to the mental health indicator questions stratified by country of deployment and rank. Overall, rates of self-reported feeling depressed were 70.3 per 10,000 person-surveys with the highest rate (92.8 per 10,000 among those who failed to complete the current country assignment on the form. Rates of self-reported depression among those in Afghanistan were lower than those of troops from Iraq (32.3 vs. 69.7 per 10,000 person-surveys, $p < 0.0001$). Compared to self-reported feelings of depression, the rates for other combat stress indicators were considerably lower with overall rates of

feelings of self-harm, preference of seeing a mental health provider or a chaplain reported as 6.5, 7.5, and 11.2 per 10,000 person-surveys, respectively. There were similar differences in these combat stress indicator rates among country of deployment as was found with feelings of depression.

In addition to country of deployment, rank was associated with differences in self-report of combat health indicators. Feelings of depression and self-harm were inversely correlated with rank of individual (4-level ordinal grouping) ($\beta_{\text{Coef}} = -0.21$, $p=0.0006$, $\beta_{\text{Coef}} = -0.49$, $p<0.0001$, respectively). Preference for seeing a chaplain trended towards a positive correlation with increasing ordinal levels of rank ($\beta_{\text{Coef}} = 1.24$, $p=0.13$).

Because country of deployment and rank were both associated with the combat stress outcomes and with each other, a multivariate Poisson regression model for the outcomes and covariates of country of deployment and rank were fit. After adjusting for rank, troops from Iraq (IRR 2.1) and 'country not stated' (IRR 2.8) were at higher risk for self-reported feelings of depression compared to troops deployed to Afghanistan ($p<0.01$). Rank remained independently associated with the depression outcome, with enlisted demonstrating higher risk of self-reported depression compared to officer ranks (IRR: 2.5, 95% CI 1.3 to 4.8). Similar direction and magnitudes were noted for other combat stress indicators, though the association was not statistically significance.

There were distinct temporal trends found in reported combat stress rates over time which appeared to match the rate or number of deaths reported in the country during the same period. For self-reported depression in Iraq (Figure 1), the rate during May 2004 was higher than other months and was preceded by a month ("Bloody April") [6] where troops experienced high fatality rates. Similarly, for Afghanistan while more variable, there appears to be an association between rates of self-reported depression and numbers of reported fatalities during that month (Figure 2).

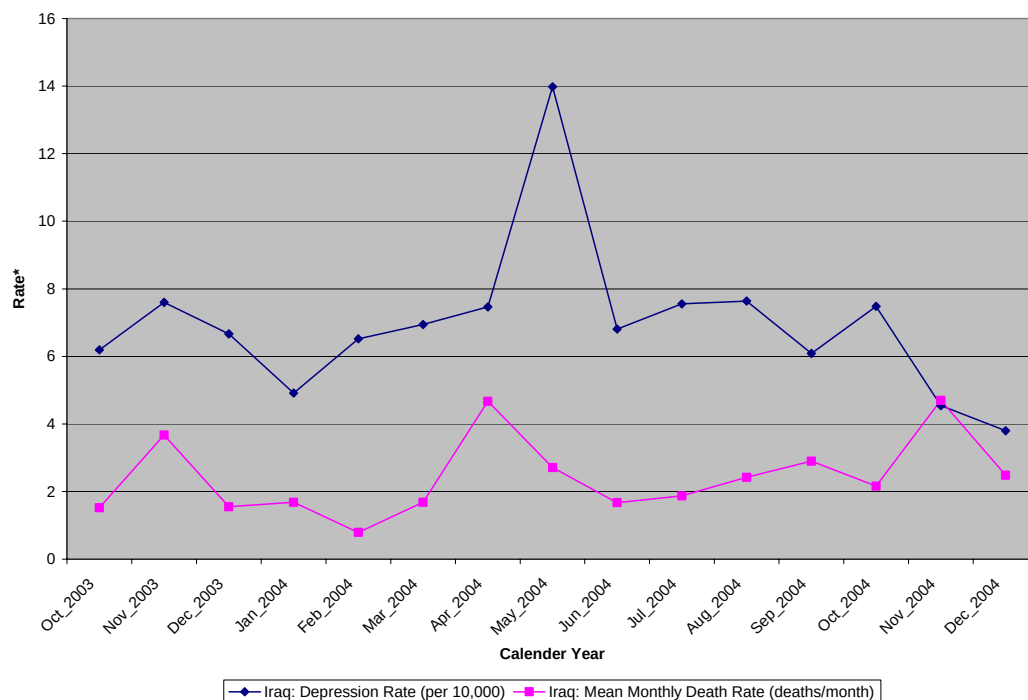


Figure 1: Rates of depression and monthly death rates among deployed troops in Iraq during October 2003 – December 2004.

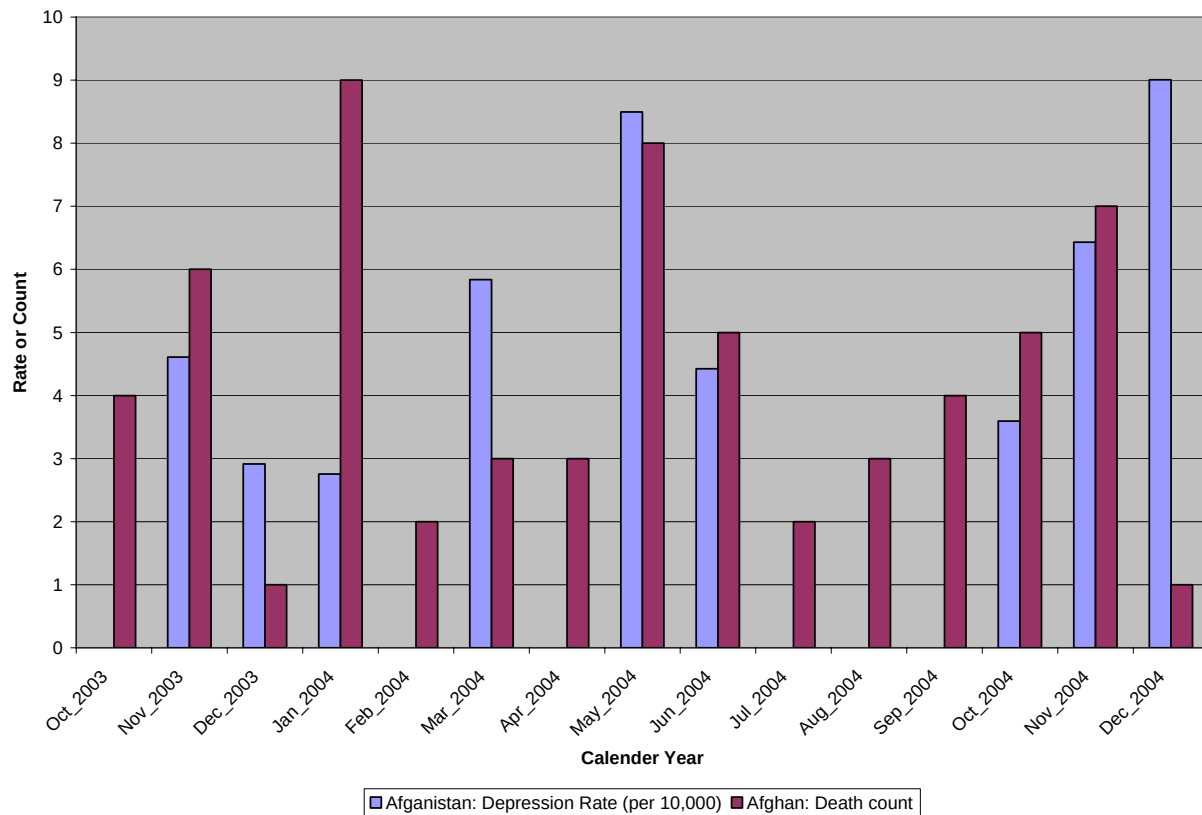


Figure 2: Rates of depression and monthly death counts among deployed troops in Afghanistan during October 2003 – December 2004.

4.0 DISCUSSION

The stress associated with combat presents itself as a spectrum of outcomes ranging from normal battle reaction (not a casualty), to acute anxiety and depressive syndromes, to atypical syndromes with numerous determinants falling under the broad categories of biological, situational, intrapsychic and interpersonal factors.[7] In our clinic screening data, we found combat stress indicators that were relatively higher among troops in Iraq compared to Afghanistan, more common in the lower ranks, and temporally associated with higher intensity combat periods (at least in Iraq). These associations persisted when adjusting for potential confounding. Our findings are not novel, and have in fact, been well described in previous conflicts throughout the decades. The finding of twice the rates of combat stress (as measured by depression and other indicators) among troops deployed to Iraqi compared to Afghanistan is consistent with the overall fatality rate for 2004 (a proxy measure for battle intensity) between the two combat settings (OIF: 5.0 deaths per 1000 person-years, OEF: 2.7 deaths per 1000 person-years).[5, 8] Historically, low-intensity warfare has resulted in casualties with depressive symptoms, whereas those from mid- to high-intensity combat primarily present with anxiety, conversion and dissociative symptoms. Similarly, Jones et al. found that while anxiety and fear symptoms predominated among combat soldiers in Vietnam, combat-support troops were more likely to present with depressive type symptoms.[13] Other factors associated with differential rates of combat stress indicators were rank and monthly casualty count. Levav and colleagues describe rates of psychiatric breakdown among officers being one-fifth those of enlisted men.[15] Our findings were consistent with this

trend and can be interpreted based on differences between the ranks in terms of role in combat, stressors at home and possibly prior experience in real or enacted combat situations. Our findings demonstrate a strong correlation between monthly rates of fatalities and self-reported combat stress indicators, particularly in Iraq and less so in Afghanistan. As previously discussed, this is consistent with what previous authors have reported. The relatively poor correlation between monthly casualties and combat stress indicators in OEF might also be explained by differences in combat environments, troop population sampling, or other factors.

Our study is not without limitations, particularly stemming from the fact that we analyzed data that were originally collected as part of a clinical health screening tool and not for epidemiological study purposes. We are limited in that we do not have a reference group to ascertain if the rates of combat stress indicators are any different than that of similar non-deployed troops in garrison or deployed troops to non-combat situations. However, we feel that given the differential rates between troops deployed to Iraq and Afghanistan are indicative of a real phenomenon. Furthermore, our definition of our primary stress indicator, depression, was based on a single question asking the soldier if they felt depressed. However, at least one randomized controlled trial in a primary care setting has found that a simple question about depression had similar performance compared to a 20-item questionnaire.[16] We caution the interpretation of the actual reported rates of combat stress. As these soldiers are being interviewed having just arrived to Doha, Qatar, often after a long journey, and expecting to spend the next four days with relatively few constraints, there is likely to be an under reporting of the outcomes, thus explaining the relatively low rates reported (i.e. depression rate of 7 per 1000 troops). Furthermore, we are not able to infer whether the self-reported depression had any functional impact on the war-fighter, nor were we able to assess any other common combat stress outcomes. Future studies, specifically designed to address these limitations could be conducted. We also think that it would be interesting to study if the R&R leave program has any effect on decreasing combat stress as was postulated during the Korean War.[17]

This study serves to reinforce our understanding of determinants of combat stress, as well as prompt a number of questions regarding factors related to differential combat stress in the current combat environments. We also feel that this secondary use of data collected for the primary purpose of clinical screening could be used as a useful surveillance tool for measuring ongoing levels of combat stress. Further study based on good epidemiologic study design and appropriate combat stress paradigms should be conducted and utilized to mitigate the immediate effects of combat stress and the subsequent development of post-traumatic stress disorder is warranted. Finally, we agree with Gal and Jones who state, “Students of war and combat agree that the most precious commodity in battle is not armaments but people. The understanding and application of [the combat stress model] may conserve and increase the efficiency of the vital human resource.”[14]

DISCLAIMER

The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U.S. Government

SOURCE OF SUPPORT

This work was supported by work unit number GEIS-E0018.

COPYRIGHT STATEMENT

I am a military service member. This work was prepared as part of my official duties. Title 17 U.S.C. §105 provides that ‘*Copyright protection under this title is not available for any work of the United States*

Government. Title 17 U.S.C. §101 defines a U.S. Government work as a work prepared by a military service member or employee of the U.S. Government as part of that person's official duties.

5.0 REFERENCES

1. Grossman D: **On killing. II: The psychological cost of learning to kill.** *Int J Emerg Ment Health* 2001, **3**(3):137-144.
2. Hoge CW, Castro CA, Messer SC, McGurk D, Cotting DI, Koffman RL: **Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care.** *N Engl J Med* 2004, **351**(1):13-22.
3. Engel AG, Aquilino CA: **Combat duty in Iraq and Afghanistan and mental health problems.** *N Engl J Med* 2004, **351**(17):1798-1800; author reply 1798-1800.
4. Turner MA, Kiernan MD, McKechnie AG, Finch PJ, McManus FB, Neal LA: **Acute military psychiatric casualties from the war in Iraq.** *Br J Psychiatry* 2005, **186**:476-479.
5. **Iraqi Coalition Casualty Count**, accessed 21 January 2006, <http://icasualties.org/oif/default.aspx>
6. Steele D: **Bloody April.** In: *Army Magazine August 2004.* vol. 58; 2004: Accessed via the internet on 23 January 2005, <http://www.ausa.org/www/armymag.nsf>
7. Jones FD: **Chapter 1: Psychiatric Lessons of War.** In: *War Psychiatry Textbook of Military Medicine Part I, Warfare, weaponry, and the casualty ; [v 4].* Edited by Jones FD. Bethesda, Md.: Office of the Surgeon General, United States Army Medical Department Center and School ; Walter Reed Army Institute of Research ; Uniformed Services University of the Health Sciences; 1995: 1-33.
8. Department of Defense: **Military Personnel Statistics.** In. Edited by Directorate for Information Operations and Reports SID; Accessed January 21, 2006.
9. Jones E, Wessely S: **Psychiatric battle casualties: an intra- and interwar comparison.** *Br J Psychiatry* 2001, **178**:242-247.
10. Noy S: **Battle intensity and the length of stay on the battlefield as determinants of the type of evacuation.** *Mil Med* 1987, **152**(12):601-607.
11. Price HH: **The Falklands: rate of British psychiatric combat casualties compared to recent American wars.** *J R Army Med Corps* 1984, **130**(2):109-113.
12. Solomon Z, Mikulincer M, Jakob BR: **Exposure to recurrent combat stress: combat stress reactions among Israeli soldiers in the Lebanon War.** *Psychol Med* 1987, **17**(2):433-440.
13. Jones FD et al.: **Psychiatric lessons of low-intensity wars.** *Ann Med Milit Fenn [Finland]* 1985, **60**:128-134.
14. Gal R, Jones FD: **Chapter 6: A Psychological Model of Combat Stress.** In: *War Psychiatry Textbook of Military Medicine Part I, Warfare, weaponry, and the casualty ; [v 4].* Edited by Jones FD. Bethesda, Md.: Office of the Surgeon General, United States Army Medical Department Center and School; Walter Reed Army Institute of Research; Uniformed Services University of the Health Sciences; 1995: 133-148.

15. Levav I, Greenfeld H, Baruch E: **Psychiatric combat reactions during the Yom Kippur War.** *Am J Psychiatry* 1979, **136**(5):637-641.
16. Williams JW, Jr., Mulrow CD, Kroenke K, Dhanda R, Badgett RG, Omori D, Lee S: **Case-finding for depression in primary care: a randomized trial.** *Am J Med* 1999, **106**(1):36-43.
17. Glass AJ: **Psychiatry in the Korean Campaign (Installment 1).** *U S Armed Forces Med J* 1953(4):1387-1401.