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The Impact of Reported Direct and Indirect Killing on Mental Health Symptoms in Iraq War Veterans

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This study examined the mental health impact of reported direct and indirect killing among 2,797 U.S. soldiers returning from Operation Iraqi Freedom. Data were collected as part of a postdeployment screening program at a large Army medical facility. Overall, 40% of soldiers reported killing or being responsible for killing during their deployment. Even after controlling for combat exposure, killing was a significant predictor of posttraumatic disorder (PTSD) symptoms, alcohol abuse, anger, and relationship problems. Military personnel returning from modern deployments are at risk of adverse mental health conditions and related psychosocial functioning related to killing in war. Mental health assessment and treatment should address reactions to killing to optimize readjustment following deployment.

Military personnel involved in modern wars are at high risk of killing, especially given the proximity of combatants and civilians, the indistinctiveness of the enemy, the chaos of urban environments, and the ambiguity of the front line. Hoge and colleagues (2004) found that 77 to 87% of soldiers in combat infantry units returning from Operation Iraqi Freedom (OIF) reported shooting or directing fire at the enemy, 48 to 65% reported being responsible for the death of an enemy combatant, and 14 to 28% reported being responsible for the death of a noncombatant.

Few studies have explored killing in the war zone as a risk factor for combat-related psychiatric and social disturbances. In one study that specifically examined taking a life during the Vietnam War within a larger model, a strong and significant relationship emerged between killing and posttraumatic stress disorder (PTSD; Fontana & Rosenheck, 1999). In fact, the authors found that once killing was removed from their separate atrocities variable, the atrocities variable no longer significantly predicted PTSD symptoms, suggesting that killing was the potent ingredient in predicting PTSD. Similarly, MacNair (2002) directly examined the association between killing/inflicting violence and PTSD in Vietnam veterans and found a significant relationship between taking a life in combat and PTSD symptoms.

The purpose of this study is to examine the relationship between killing and mental health in returning Iraq War veterans. To our knowledge, this is the first study to examine the consequences of taking another life among OIF service members. We extend prior

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research by examining the relationship between taking another life and multiple mental health outcomes, including depression and alcohol abuse, and psychosocial functioning outcomes (anger and relationship problems). Identifying the impact of killing has important implications for the evaluation and treatment of our newly returning service members.

METHOD

Participants

Participants included 2,797 OIF soldiers who presented for their postdeployment screening from November 2005 to June 2006. Our initial sample included 3,141 soldiers who completed postdeployment screening; however, only 3,016 of these soldiers had served overseas as part of OIF. Our final sample was 2,797 due to missing data on race/ethnicity and mental health symptom variables. We compared all OIF soldiers who were included in the final sample to those who were excluded due to missing data and found no differences on any of the other demographic or exposure variables. Participants had a mean age of 28 years ($SD = 6$; range = 18–52). Other demographic and military service characteristics are reported in Table 1.

Table 1. Descriptives for Demographic and Military Variables

Variable	%	Range
Gender		0–1
Male	94	
Female	6	
Race/Ethnicity		0–6
American Indian/Native Alaskan	2	
Asian/Pacific Islander	6	
Black	13	
Hispanic	11	
White	65	
Other	3	
Education		0–5
Less than high school	3	
High school	34	
Some college	40	
Associates degree	6	
College graduate (Bachelors degree)	14	
Postgraduate/professional degree	3	
Spouse/Partner		0–1
Yes	77	
No	23	
Number of deployments		0–3
One	85	
Two	14	
Three or more	1	

Measures

Soldiers reported age, gender, race/ethnicity, educational status, relationship status, and number of OIF deployments, and they responded to three questions to assess level of combat exposure: (a) During combat operations did you become wounded or injured? (b) During combat operations, did you see the bodies of dead soldiers or civilians? (c) During combat operations, did you personally witness anyone being killed? The response format for each question was dichotomous (yes/no). The sum score of these variables was utilized for the purposes of the regression analyses.

Soldiers responded to the following question to assess direct and indirect killing experiences, "During combat operations did you kill others in combat (or have reason to believe that others were killed as a result of your actions)?" The response format was dichotomous (yes/no). From this point forward, when we refer to killing, we include both reported direct and indirect killing, as described above.

Posttraumatic stress disorder was assessed using the Primary Care PTSD Screen (PC-PTSD; Prins et al., 2003). The PC-PTSD is a four-item self-report screening instrument for PTSD that utilizes a dichotomous response format (yes/no) for each symptom: reexperiencing, avoidance, emotional numbing, and hyperarousal. Using a PC-PTSD cutoff score of 3 and the Clinician Administered PTSD Scale (CAPS; Blake et al., 1995) as the gold standard for PTSD diagnosis, the PC-PTSD demonstrated acceptable sensitivity and specificity, with a correlation of .83 with CAPS diagnoses. Recent work with active-duty soldiers suggested a lower cutoff of 2 is more appropriate to increase sensitivity (Bliese et al., 2008). For the purposes of this study, we report results using a cutoff score of 2 (and 3) when reporting those screening positive for PTSD and total PC-PTSD score when determining predictors of PTSD symptoms in the regression equations. The Cronbach's alpha for the current sample was .79.

Depression was assessed using the Patient Health Questionnaire (PHQ-9; Kroenke & Spitzer, 2002). The PHQ-9 is a nine-item, self-administered scale that is based on diagnostic criteria according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*; American Psychiatric Association, 1994). Each item is scored on a 4-point scale with responses ranging from *not at all* to *nearly every day*. The PHQ-9 has two scoring methods, one for diagnostic purposes and one for measuring severity, with a cutoff score of 5 suggested for mild depression (Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001). In this study, we used a cutoff score of 5 when reporting those screening positive for depression and total PHQ-9 score when determining predictors of depression symptoms. The Cronbach's alpha for this sample was .87.

Alcohol abuse was assessed using the Alcohol Use Disorder Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993). Alcohol consumption scoring is based on a five-point scale, ranging from *never* to *daily or almost daily*. A score of 8 or higher indicates "hazardous or harmful consumption" (Saunders et al., 1993). For the purposes of this study, we used a cutoff score of 8 when reporting those screening positive for alcohol abuse and total AUDIT score when determining predictors of problem drinking in the regression equations. The Cronbach's alpha for the current sample was .78.

Hostility/anger was assessed using the Dimensions of Anger (DAR; Novaco 1975). The DAR is a seven-item scale that has been suggested for use in PTSD evaluation (Forbes et al., 2004). The DAR assesses a wide range of anger responses, including "I often find myself getting angry at people or situations" and "When I get angry, I stay angry." Participants respond to each item on a 10-point scale, with responses ranging from *not at all* to *absolutely*. The DAR has been shown to be reliable and sensitive and has been previously used with combat veterans (e.g., Forbes et al., 2004). In this study, we used total DAR score for the purposes of determining predictors of hostility/anger in our regression equation. The Cronbach's alpha for this sample was .89.

Relationship problems were assessed by asking participants to respond to the following: "Are you having marital or relationship problems?" The response format was dichotomous (yes/no).

Procedure

Data were derived from a postdeployment screening database at a large Army medical facility. The program is an expanded version of a standard postdeployment screening program conducted throughout the Army and Department of Defense for all service members 90 to 180 days after returning from an operational deployment (the Post-Deployment Health Reassessment program; Department of the Army, 2006). All participants who returned from OIF deployments were eligible for participation; no information is available on rates of refusal. The program provides a general health assessment, including mental health screening. In this study, soldiers completed a set of screening measures and self-reported demographics and deployment-related information. Soldiers subsequently were seen by medical personnel for injury prevention, smoking cessation, or other reported physical concerns as needed, and a credentialed behavioral health provider met individually with each soldier. All policies and procedures were approved by Madigan Army Medical Center's Institutional Review Board. Informed consent was not obtained given that this study involved a retrospective review of records.

Data Analysis

All of the analyses in this study were performed using the statistical software package SPSS version 16.0 for Windows. First, we calculated percentages of individuals who reported exposure to indices of combat and taking another life in war. Next, we computed the percentage of individuals in our sample who met screening criteria for each of the mental health outcomes (PTSD, depression, alcohol abuse). Finally, we conducted a series of regression analyses to identify predictors of each of our outcome measures.

We conducted multiple and logistic regressions to determine if reported direct and indirect killing was significantly associated with each outcome. In these analyses, we included the combat exposure variable to ensure that the results were not due to merely participating in combat (i.e., we controlled for being injured in combat, exposure to dead bodies, and witnessing killing). Each regression equation included demographic variables, combat exposure, and reported direct and indirect killing. For correlations among variables included in the regression equations, see Table 2.

RESULTS

In this study, 16% of soldiers reported being injured, 77% reported seeing dead bodies, 56% reported witnessing killing, and 40% reported killing in combat. Furthermore, 22% (13% using a cutoff score of 3) met threshold screening criteria for PTSD, 32% for depression, and 25% for alcohol abuse. Soldiers also reported anger symptoms ($M = 8.43$, $SD = 9.61$, range = 0–56) and relationship problems ($M = .33$, $SD = .69$, range = 0–1).

Five regression analyses were conducted with each of the mental health and psychosocial functioning variables as outcomes (see Table 3). In the multiple regression predicting PTSD symptoms, ethnic minority status and female gender were each significant predictors. Reported direct and indirect killing remained significant, even after controlling for combat exposure, $F(7, 2789) = 41.23$, $p < .01$.

In the multiple regression predicting depression symptoms, lower education, ethnic minority status, female gender, and combat exposure were each significant predictors of depression. However, reported direct and indirect killing was not significant, $F(7, 2789) = 16.08$, $p < .01$.

In the multiple regression predicting alcohol abuse, younger age, lower education, male gender, and being single were each significant predictors. Furthermore, reported direct and indirect killing was a significant predictor of alcohol abuse, even after controlling for combat exposure, $F(7, 2789) = 43.45$, $p < .01$.

In the multiple regression predicting hostility/anger, younger age, lower education, and female gender were significant predictors. Furthermore, reported direct and indirect killing remained significant after controlling for combat exposure, $F(7, 2789) = 23.37$, $p < .01$.

In the logistic regression predicting relationship problems, lower education, female gender and being married/in a relationship were each significant predictors. Reported direct and indirect killing was a significant predictor of relationship problems, while combat exposure was not.

Table 2. Correlations among Demographic, Exposure, and Outcome Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	–												
2. Gender	.02	–											
3. Ethnicity	.07**	.11**	–										
4. Education	.45**	.06**	−.03	–									
5. Spouse	.20**	−.04*	.02	.10**	–								
6. Deployments	.11**	.06**	−.01	.01	.04*	–							
7. Combat	−.09**	−.23**	−.09**	−.10**	.03	−.12**	–						
8. Kill	−.15**	−.19**	−.11**	−.13**	−.02	−.14**	.57**	–					
9. PTSD	−.05**	.01	.03	−.07**	.03	−.01	.28**	.21**	–				
10. Depression	−.06**	.05*	.04*	−.11**	.01	.01	.14**	.10**	.55**	–			
11. Alcohol	−.24**	−.10**	−.06**	−.18**	−.10**	−.03	.18**	.18**	.22**	.30**	–		
12. Anger	−.13**	−.00	.00	−.12**	−.00	.01	.17**	.17**	.46**	.62**	.33**	–	
13. Relationship	−.01	.03	.03	−.08**	.15**	.04	.05**	.07**	.22**	.35**	.19**	.26**	–

Note. Gender: 0 = male, 1 = female; Ethnicity: 1 = Caucasian 2 = ethnic minority; Spouse: 0 = single, 1 = married/in a relationship; PTSD = posttraumatic stress disorder.
* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

DISCUSSION

Our results indicate that a significant percentage of soldiers who served in OIF at one large Army installation reported that they killed or were responsible for killing during their deployment (40%). Killing in combat was a significant predictor of PTSD symptoms and alcohol abuse, even after controlling for combat exposure, suggesting that taking a life in combat is a potent ingredient in the development of mental health difficulties. Killing was also a significant predictor of psychosocial functioning, including anger and relationship difficulties. Overall, this suggests a complex clinical picture that may develop as a result of military personnel carrying out their duties in the war zone. Not only are military personnel who kill at risk for PTSD symptoms, but also for a number of other mental health symptoms and psychosocial problems.

Our finding that taking another life in war is a significant, independent predictor of multiple mental health symptoms, even after controlling for potent combat experiences such as being injured in war, has important implications for the healthcare of veterans. These results provide evidence that a comprehensive evaluation of veterans returning from combat should include an assessment of direct and indirect killing and reactions to killing. This information can be incorporated into a treatment plan, which would include specific interventions targeted at the impact of killing.

Table 3. Regression Models of Mental Health and Psychosocial Functioning Outcomes

	PTSD		Depression		Alcohol		Anger		Relationship Problems		
Predictors	β	R^2	β	R^2	β	R^2	β	R^2	Wald	OR	95% CI
Age	−.02		−.01		−.18**		−.09**		.03	1.00	.98–1.02
Education	−.03		−.09**		−.07**		−.06**		15.20**	.79	.70–.89
Ethnicity	.05*		.04*		−.02		.02		2.16	1.20	.94–1.51
Gender	.08**		.09**		−.06**		.05*		7.65**	1.87	1.20–2.91
Spouse	.03		.02		−.06**		.02		56.61**	4.48	3.02–6.61
Combat	.26**		.14**		.10**		.12**		.53	1.06	.91–1.22
Kill	.07**		.02		.07**		.10**		7.31**	1.47	1.11–1.95
		.09**		.04**		.10**		.05**			

Note. PTSD = Posttraumatic stress disorder; Ethnicity: 1 = Caucasian 2 = Ethnic Minority; Gender: 0 = male, 1 = female; Spouse: 0 = single, 1 = married/in a relationship; Combat = sum of combat exposure variables; Kill: 0 = no, 1 = yes; PTSD = Primary Care PTSD Screen; Depression = Patient Health Questionnaire; Alcohol = Alcohol Use Disorder Identification Test; Anger = Dimensions of Anger Scale; Relationship problems: 0 = no, 1 = yes. R^2 = adjusted R^2.
* $p < .05$. ** $p < .01$.

In addition to the mental health and social problems identified in our study, other investigations suggest that the experience of killing may be associated with moral injury and changes in spirituality/religiosity (e.g., Fontana & Rosenheck, 2004). It is critical that future research examine the broad impact of taking another life in combat.

Although killing experiences are important to evaluate and incorporate into treatment, doing so in the most sensitive fashion and within the context of a sound therapeutic relationship is of critical importance. Military personnel who have killed may experience significant shame and/or guilt and need to know that they will be allowed to explore the impact of killing in a safe and supportive environment (e.g., Veterans Affairs). They also may have received criticism or been subject to insensitive questioning by acquaintances, friends, or family members that cause them to be weary of speaking to others about this sensitive issue, especially when they fear others will not understand or judge them for their actions.

There are several limitations of this study that should be noted. First, the current study is retrospective. Second, this investigation was conducted with American OIF soldiers at one large Army installation; therefore these results may not generalize to other military branches (e.g., Air Force), veterans of other wars, or the entire U.S. Army population. Third, it is important to account for the fact that our outcome measures were self-report measures used for mental health screening rather than diagnostic instruments. Despite the fact that clinically significant cutoff scores have been recommended for each of these measures, these results should be replicated with clinician-rated diagnostic tools (e.g., Clinician Administered PTSD Scale for DSM-IV; Blake et al., 1995). Our results should not be generalized to those with mental health diagnoses given that we measured mental health symptoms. Additionally, some variables were assessed using a single indicator and future studies should replicate these results with more comprehensive measures. We did not have a comprehensive measure of combat exposure in the dataset, and as a result, we used three variables as markers of combat exposure. Consequently, there are facets of combat exposure that may not be represented. Our killing measure assessed both reported direct (killing others in combat) and indirect killing experiences (i.e., the belief that others were killed as a result of one's actions), which should be taken into account when interpreting these findings, as well as the fact that reports of killing could not be independently verified. Finally, it is important to note that our regressions did not explain a large percentage of the variance in each outcome. Future investigations that utilize broader sets of health and deployment information are needed to further understand potential mediators and moderators in these models, such as prior mental health difficulties and prior trauma.

In conclusion, we found that a significant percentage of soldiers serving in OIF endorse killing, which places them at risk for a number of mental health difficulties and related psychosocial problems. Assessment and acknowledgement of killing experiences may help prevent the perpetuation of shame, stigma, and secrecy associated with taking a life in combat. Including killing in our evaluation and treatment planning will ensure that we are providing comprehensive health care to our newly returning veterans as they face the challenges of reintegration and readjustment to their postmilitary lives.

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