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How Do Aftermath of Battle Experiences Affect Returning OEF/OIF Veterans?

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Abstract

Aftermath of battle experiences (ABE) may contribute to adverse mental and physical health outcomes. This study examined ABE and their effect on health functioning and posttraumatic stress disorder (PTSD) in 66 OEF/OIF/OND Veterans. Bivariate correlations were conducted to investigate the contribution of ABE to PTSD and health functioning, after controlling for combat experiences. Additionally, a mediation analyses was conducted on Role Limitations due to Emotional Problems. Results suggested that the association between ABE and Role Limitations due to Emotional Problems was mediated by PTSD. These initial findings suggest the need for more research on differences in deployment experiences.

Keywords

PTSD; Veterans; Combat Experiences; Aftermath of Battle; OEF/OIF Veterans; Mental Health; Health Functioning

Veterans of the wars in Iraq and Afghanistan have been noted to experience mental health problems subsequent to deployment and combat exposure (Eisen et al., 2012; Lapierre, Schwegler, & Labauve, 2007; McDevitt-Murphy et al., 2010). Previous longitudinal studies conducted from 2001 to 2008 found that PTSD, depression, anxiety disorder, substance abuse disorder, and alcohol use disorder were of the most prevalent mental health problems in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) veterans (Seal et al., 2009; Milliken, Auchterlonie, & Hoge, 2007). Existing studies have also demonstrated that veterans with greater PTSD severity also exhibited worse physical and mental health functioning post-deployment (Castro & McGurk, 2007; Wagner, Wolfe, Rotnitsky, Proctor, & Erickson, 2000). Although research has demonstrated that combat experiences have negative effects on military personnel, the concept of “aftermath of battle” experiences have received less attention in the literature. This phrase denotes experiences that are typically non-life threatening situations that military personnel may encounter immediately following a battle. The purpose of the present study was to provide a preliminary glimpse into whether Aftermath of Battle Experiences (ABE) may be associated with unique effects on the mental

and physical health functioning of military personnel following deployment, beyond the impact of Combat Experiences (CE).

Numerous studies have documented the link between CE and negative mental health outcomes post-deployment in battles throughout history from World War II (Sutker, Allain, & Winstead, 1993) to the recent Iraq War (Vasterling et al., 2008). CE can be conceptualized as situations military personnel might experience while in combat, such as firing at combatants, witnessing enemy and ally deaths, searching/clearing homes, etc. Soldiers who experience greater levels of combat exposure tend to have higher levels of PTSD than soldiers reporting moderate to low levels of exposure (Castro & McGurk, 2007; Lee, Goudari, Baldwin, Rosenfield, & Telch, 2011). Some of the most common CE linked to PTSD severity include experiencing enemy fire and witnessing deaths of allies or non-combatants (Cesur et al., 2013). Pietzark, Whealin, Stotzer, Goldstein, and Southwick (2011) also found that witnessing a member from the same unit or an allied unit being seriously wounded or killed, being exposed to friendly fire, and being exposed to land mines were significantly associated with greater PTSD severity in a sample of OEF/OIF National Guard veterans.

Prior studies have suggested that PTSD plays a salient role following traumatic experiences in physical health functioning (Vasterling et al., 2008; Wagner et al., 2000). In a study of patients at an anxiety clinic in a rural medical center, SF-36 scores were used to measure subjective health functioning in patients with PTSD. Patients suffering from PTSD were at greater risk for impaired physical health functioning and medical conditions relative to persons without PTSD who experienced the same index trauma (Zayfert, Dums, Ferguson, & Hegel, 2002). Wolfe, Schnurr, Brown, & Furey (1994) were the first to examine the independent effects of combat exposure and PTSD on physical health in a sample of Vietnam veterans. Using a series of hierarchical regression analyses, the authors determined that the relation between combat exposure and health outcomes was mediated by PTSD symptoms (Wolfe et al., 1994). Friedman and Schnurr (1995) found similar results such that PTSD indirectly accounted for 56% of the total effect when performing path analyses to predict self-reported current health status. However, the question of whether CE have a unique impact on health functioning post-deployment still remained unanswered. Vanderploeg and colleagues (2012) posited that higher scores on the Deployment Risk and Resiliency Inventory subscale of Combat Experiences which included items such as seeing others wounded in battle, seeing the death of a buddy in battle, and experiencing a loss of a leader were significantly associated with back pain, irritability, and indigestion. Health functioning was assessed using several different measures, including the 12-item Short-Form Health Survey and the Post-Deployment Health Assessment (which measured physical symptoms). The authors found that deployed OEF/OIF National Guard members had significantly poorer physical health functioning than non-deployed OEF/OIF National Guard members (Vanderploeg et al., 2012). CE have played an essential role in later physical health functioning status of veterans post-deployment.

Although the role of CE in the development of psychopathology has been explored in prior research, there has been less attention paid to ABE. These experiences are distressing, and may contribute to adverse mental and physical health outcomes. To date, only one study has

investigated the role of ABE in mental health outcomes. Vogt, Pless, King, & King (2005) studied the effect of war zone exposures on post-deployment adjustment in a sample of Gulf War veterans selected from the Defense Manpower Data Center and the VA Gulf War Health Registry. Aftermath of battle was defined as exposure to consequences of combat (Vogt et al., 2005). These situations included observing or handling human remains, seeing devastated communities, and dealing with prisoners of war. ABE were significantly associated with PTSD and depression in this sample. However, Vogt et al. (2005) did not control for CE within this sample, which may have contributed to these findings as individuals who experience CE are likely to have had some exposure to ABE as well. The impact of ABE has not been examined among veterans of the OEF/OIF/OND conflicts.

Gaps in the literature still remain in terms of understanding how ABE may affect military personnel following deployment. Although ABE experiences may coincide with CE, it is important to parse out the effects of both events. The present study is an exploratory investigation on the topic of ABE. We first hypothesized that ABE would be negatively correlated with mental and physical health functioning outcomes, as assessed by the SF-36 which included physical functioning, role limitations due to physical health and emotional problems, energy and fatigue, emotional well-being, social functioning, bodily pain, and general health. The second hypothesis was that ABE would be positively correlated with PTSD severity. We also hypothesized that ABE would be associated with worse mental and physical health functioning measured by the SF-36 post-deployment, even after controlling for the effect of CE.

Method

Participants

Sixty-six veterans were recruited from a Veterans Affairs Medical Center (VAMC) who presented to a variety of clinics at the VAMC seeking healthcare. The sample was primarily male ($n = 54$; 81.8%) with ages ranging from 21 to 66 years old ($M = 35.59$, $SD = 10.66$). The sample was ethnically diverse, with 47% identifying as African American ($n = 31$), 42.4% as Caucasian ($n = 28$), and the remainder identifying as Asian, (1.5%, $n = 1$), Native American (1.5%, $n = 1$), and (6.1%, $n = 4$) multiethnic. The sample also represented a diverse population of branch members, with 59.6 % in the United States Army ($n = 37$), 14.5% in the United States Marine Corps ($n = 9$), 11.3% in the United States Air Force ($n = 7$), 12.8 % in the National Guard ($n = 8$), 4.8% in the Navy ($n = 3$), and 3.2% in the Air National Guard ($n = 2$). The average number of months deployed to a combat zone was 18.30 months ($SD = 11.90$). The average time passed since deployment was 49.05 months ($SD = 34.10$). Twenty-eight (42.4%) veterans experienced one deployment while 38 (57.6%) veterans experienced two or more deployments. Thirty-one (47%) veterans met CAPS criteria for PTSD using the F1/I2 scoring rule which designates symptoms as “present” when rated with a frequency score of at least 1 and an intensity score of at least 2 and assigns a diagnosis of PTSD if the respondent demonstrates a pattern of symptoms that fit the DSM-IV criteria.

Procedure

The Institutional Review Boards of The University of Memphis and the Memphis VAMC approved all procedures. The data for these analyses originated from a larger study that examined readjustment and coping in veterans returning from OEF, OIF, and OND combat deployments. Participants were recruited from waiting areas in a large, urban VA Medical Center, and invited to participate if interested.

Measures

Posttraumatic Stress Disorder—The Clinician-Administered PTSD Scale (CAPS; Blake et al., 1990) was used to measure PTSD symptoms based on DSM-IV criteria. PTSD was rated by a trained interviewer on the intensity and frequency of the 17 symptoms, each of which are rated on a 5-point Likert scale ranging from 0 (*the symptom does not occur or does not cause distress*) to 4 (*the symptom occurs every day or causes extreme distress*). The CAPS is considered the gold standard for assessing PTSD and has demonstrated strong internal consistency ($\alpha = .94$) and reliability ($r = .77$ to $r = .96$) in a sample of veterans (Blake et al., 1995). This measure exhibited excellent internal consistency in the present sample ($\alpha = .96$).

Along with the CAPS, the Posttraumatic Checklist-5 (PCL-5; Weathers et al., 2013) was used to measure self-reported PTSD symptomatology, using DSM-5 criteria. The PCL-5 includes 20-items, each of which are rated on a 5-point Likert scale ranging from (0) *not at all* to (4) *extremely*. These items reflect the new criteria for PTSD as assessed by the DSM-5 which include new items such as negative cognitions about the self, world, and others, and an exaggerated sense of self-blame for the traumatic event. Recent literature assessing DSM-5 PTSD symptomatology in a sample from the National Health and Resilience in Veterans Study found an overall Cronbach's α of .95 (Pietrzak et al., 2015). Additionally, Cronbach's alphas ranged from .70 to .90 on subscales of intrusive memories, negative affect, loss of interest, externalizing behaviors, and hyperarousal. This measure exhibited excellent internal consistency in the present sample ($\alpha = .97$).

Deployment Experiences—The Deployment Risk and Resilience Inventory (DRRI; King, King, Vogt, Knight, & Samper, 2006) was used to measure combat and post-combat experiences in this sample. The DRRI is a 201-item self-report measure that assesses veterans' experiences prior, during, and following combat (e.g., deployment social support, ABE). The CE scale is a 15-item, dichotomous (0 = *No*, 1 = *Yes*) scale that assesses experiences during combat. Items include “*While deployed, my unit engaged in battle which it suffered casualties*”, “*While deployed, I went on combat patrols or missions*”. This subscale exhibited excellent internal consistency ($\alpha = .89$). The Aftermath of Battle section is also a 15-item, dichotomous (0 = *No*, 1 = *Yes*) scale that assesses situations a veteran may experience directly after battle. Sample items include “*I saw refugees who had lost their homes and belongings as a result of battle*”, “*I was exposed to the sight, sounds, or smell of dying men and women*.” Scores are derived by adding up the item scores for each scale. The DRRI has exhibited high internal consistency ($\alpha > .80$) among different veteran populations (Vogt, Proctor, King, King, & Vasterling, 2008). This subscale exhibited excellent internal consistency in the present sample ($\alpha = .92$).

Health Functioning—The Short-Form Health Survey (SF-36; Ware et al., 2000) was used to measure mental and physical health functioning. The SF-36 consists of 36 self-report items that assesses subjective Physical Functioning, Role Limitations due to Physical Health and Emotional Problems, Energy and Fatigue, Emotional Well-being, Social Functioning, Bodily Pain, and General Health. In this case, the SF-36 does not assess objective health functioning such as diagnosed ailments, but assesses a subjective overall health functioning as viewed by the participants. Items include “*Does your health limit you to lift groceries, climb one flight of stairs, bend or kneel?*”, “*In the past week, have you had to cut down on the amount of time you spent on work, accomplish less, did work or other activities less carefully than usual due to any emotional problems.*” These items are rated on a 0 (*None of the time*) to 4 (*All of the time*) Likert scale. The SF-36 exhibited good internal consistency with alpha values ranging from .85 to .92 in a sample of OEF/OIF veterans (McDevitt-Murphy et al., 2010). This measure exhibited internal consistency in the present sample of alphas ranging from .83 to .94.

Data Analysis Plan

Prior to conducting our analyses, all variables were screened by examining the distributional properties. Assumptions were met for multivariate analysis per recommendations by Tabachnick and Fidell (2007). For the first and second hypotheses, we conducted bivariate correlations to examine the associations between ABE with health and emotional functioning and PTSD severity. Subsequently, a series of hierarchical linear regressions were conducted for the third hypothesis of ABE and how these experiences are associated with worse mental and physical health functioning using the SF-36 and PTSD using the CAPS and PCL-5. We controlled for CE in order to examine the unique contribution of ABE to health functioning. Finally, we conducted mediational analyses to investigate whether PTSD mediated the association between ABE and the SF-36 subscales that showed unique variance beyond the effects of CE.

Results

Table 1 displays descriptive statistics and correlational results for our primary study variables. ABE and CE were strongly correlated with each other, at $r = .70$. As predicted, veterans with higher scores on the ABE scale reported significantly worse health functioning as measured by the SF-36, including Physical Functioning, Role Limitations due to Emotional Problems, Energy and Fatigue, Well-being, Social Functioning, Pain, and General Health and greater PTSD severity. These findings are congruent with previous literature suggesting that ABE are associated with negative outcomes post-deployment.

Role limitations due to emotional problems was the one SF-36 scale for which there was a statistically significant correlation with Aftermath of Battle, but not Combat Experiences, thus we tested empirically whether ABE explained unique variance in this functional health domain. We found that ABE significantly predicted Role Limitations due to Emotional Problems beyond the effect of CE, $b = -0.38$, $t(61) = -2.27$, $p = .01$ with the overall model explaining a significant portion of variance, $R^2 = .13$, $F(1,61) = 4.55$, $p = .03$ such that higher scores on the ABE scale were associated with more role limitations.

Finally, we conducted mediation analyses to investigate whether the relationship between ABE and Role Limitations due to Emotional Problems was mediated by PTSD severity. We did not control for CE because it was not a significant predictor in the model we described earlier. Using the PROCESS macro (Model 4; Hayes, 2013), we found that the direct effect (c') of ABE on Role Limitations due to Emotional Problems was non-significant after including an indirect path through CAPS total severity in the model (as seen in Figure 1). The indirect path, based on 1000 bootstrap samples was significant ($b = -2.09$; $SE = .66$; 95% $CI = -3.50$ to $-.86$). Thus, the relation between ABE and Role Limitations due to Emotional Problems was fully mediated by CAPS severity.

Discussion

To our knowledge, this is the first study to examine the unique contribution of aftermath of battle experiences (ABE) to mental and physical functional health in a sample of OEF/OIF/OND Veterans. These ABE may include managing dead bodies, taking prisoners of war, and/or aiding the wounded (King et al., 2006). Initial findings suggested that ABE, like CE, were correlated with worse physical functioning, more role limitations due to emotional problems, less energy/more fatigue, worse emotional well-being, worse social functioning, worse bodily pain, and overall worse general health. These correlations suggest that both direct combat as well as those warzone experiences described as “aftermath of battle” situations are associated with similar adverse outcomes following deployment. We observed that the ABE scale score was significantly correlated with role limitations due to emotional problems, but that CE score was not. We followed up with a regression to test whether ABE was associated with unique effects in this domain of health functioning. We found that ABE explained unique variance after controlling for CE (which was non-significant) in role limitations due to emotional problems. This pattern of findings suggests that ABE may have some independent effects on emotional health functioning of military veterans, even beyond the impact of combat exposure.

Mental and physical health consequences from combat deployments have been well documented; however, the majority of these studies have focused on combat *per se*, and not on exposure to other distressing experiences occurring in the war-zone aside from direct combat, or they have not differentiated the two. CE involve situations that may evoke a greater degree of physiological arousal in the moment, where one's life may be in immediate danger. The nature of emotional responses involved in ABE may be different, as ABE situations involve things like seeing bodies of dead enemies or allies, handling human remains, and seeing disfigured persons post-combat.

We found that ABE and CE were both correlated with PTSD to a similar extent. We also found that PTSD played a role in the link between ABE and Role Limitations due to Emotional Problems. This mediational finding suggests that PTSD and its sequelae (in this case, Role Limitations due to Emotional Problems) may be influenced by ABE experiences, even apart from combat exposure. Pittman, Goldsmith, Lemmer, Kilmer, & Baker (2011) highlighted the unique, negative effects of PTSD on mental health related quality of life following combat in OEF/OIF veterans. However, the authors did not assess ABE in their sample. Our findings suggest that ABE could be conceptualized as a risk factor for

additional negative outcomes post-deployment and that these experiences can impact a person's health-related quality of life incrementally, beyond the effect of combat experiences. More research will be needed to fully investigate this possibility.

It is important to address some limitations of this research. This study reflects an early exploration of this topic and has several limitations that hamper our ability to draw conclusions. First, all data were collected from veterans who presented to a VA medical center, which may contribute to sampling bias, given that not all OEF/OIF veterans are VA users. Secondly, we did not have the ability to thoroughly study gender differences within the present sample due to a relatively small number of women. Women are becoming more present in combat roles and studies have shown that women are more exposed to aftermath of battle situations than men. In a study conducted to evaluate the experiences of women deployed to Iraq or Afghanistan, women were more likely to report handling human remains than men (Hoge et al., 2006; Street et al., 2009). So these issues may be particularly important to examine in women. This study was based on cross-sectional, retrospective self-report data, and participants were asked to recall experiences from past deployments. Veterans may have a hard time remembering their experiences or their responding could have been biased based on their current emotional state.

The topic of how aftermath of battle experiences affect returning military personnel would benefit from more elaborate future studies. For instance, collecting data on this topic, along with other descriptive factors, while in theatre would help to provide a complete picture of the extent of ABE and CE and how they affect individuals. Finally, following up this line of inquiry in a larger sample might help investigators to detect some of the subtler unique effects of ABE. With respect to treatment implications, these findings suggest that attending to stressors and reactions outside of the prototypical Criterion A traumas and PTSD symptoms may be important in this population. Gray et al. (2012) have demonstrated that treatment for PTSD using Adaptive Disclosure (an adaption of CBT techniques for PTSD that addresses issues like grief and loss in addition to PTSD) while in garrison from recent deployment reduced PTSD symptoms significantly in marines training for redeployment. In general, the present findings suggest that a thorough assessment of deployment related experiences (including stressors that may not meet the Criterion A definition of a trauma) could be beneficial in treatment, as these additional stressors may contribute to PTSD, and to one's emotional functioning. Despite the limitations of the present study, it does provide insight to the potential consequences of ABE and the negative outcomes associated with witnessing such events. The findings of this study highlight the need for future research aimed at better elucidating the effect of ABE on military personnel.

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Figure 1. Mediation Analyses between ABE and Role Limitations due to Emotional Problems and PTSD.

* $p < .05$ ** $p < .01$, *** $p < .001$

Table 1

Correlations between SF-36, CAPS Severity, PCL-5 Severity, BDI Severity, and BAI Severity with DRRI Aftermath of Battle and CE Items. Means and Standard Deviations of the SF-36, CAPS, and PCL-5.

	DRRI			
	Aftermath of Battle	Combat Experiences		
	<i>r</i>	<i>r</i>	<i>M</i>	<i>SD</i>
Physical Functioning	-.27*	-.34**	60.14	31.67
Role limitations due to Physical Health	-.19	-.05	48.79	44.45
Role limitations due to Emotional Problems	-.36**	-.24	50.00	45.87
Energy and Fatigue	-.43**	-.33*	43.62	25.16
Emotional Well-being	-.38**	-.34**	52.14	27.09
Social Functioning	-.43**	-.37**	50.40	32.88
Pain	-.32*	-.41**	46.77	28.12
General Health	-.33**	-.35**	48.87	24.60
CAPS total	.38**	.37**	53.21	31.63
PCL-5 total	.44**	.45**	38.34	25.10
Aftermath of Battle		.70**	7.93	5.02
Combat Experiences	.70**		7.87	4.15

Note. Correlations for the Deployment Risk and Resiliency Intake: Aftermath of Battle and CE subscales with the RAND Short-Form Health Survey subscales. Correlations for the Deployment Risk and Resiliency Intake: Aftermath of Battle and CE subscales with the Clinician Administered PTSD Scale, PTSD Checklist-5, Beck's Depression Intake, Beck's Anxiety Intake, and ABE.

* $p < .05$

** $p < .01$.