

Deployment-Related Factors, Mental Health, and Suicide: Review of the Literature

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ABSTRACT

The relationship between military deployment, mental health, and suicide is complex. The purpose of this paper is to provide a review of the scientific literature pertaining to deployment-related factors that have been associated with risk for mental health problems and suicide. The potential adverse impact of military deployment on mental health and suicide-related ideation and behaviors is expected to be precipitated by an interaction between the service member's pre-existing biopsychosocial vulnerabilities, experiences during the time of deployment, and post-deployment adjustment and reintegration. Factors including deployment length, number of deployments, and location of deployment can serve as additional determinants of deployment-related mental health problems including suicidal thinking and behaviors. Primary and specialty care providers serving military populations can greatly benefit from better understanding potential deployment-related factors associated with favorable and unfavorable mental health outcomes among service members. Furthermore, additional research on this topic is needed and researchers are encouraged to consider various conceptual models in explaining the path between deployment and the onset, maintenance, or exacerbation of mental health problems and suicidality among military personnel.

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1.0 INTRODUCTION

The Heritage Foundation's comprehensive time series data on the United States (U.S.) troop deployments indicates that a total of 125,900,725 military service members have been deployed worldwide from 1950 to 2005 (1). Currently, approximately three million Americans serve in the Army, Navy, Air Force, Coast Guard, Marine Corps, Reserves, and the National Guard (2). The vast majority of these individuals are involved in the U.S. military engagements in Operation Enduring Freedom (OEF; initiated in October 2001) and Operation Iraqi Freedom (OIF; initiated in March 2003) which were launched following the terrorist attacks of September 11, 2001. Since the onset of OEF/OIF and with the increasing number of service members facing at least one deployment, multiple deployments, and/or longer than expected deployments, much attention has been paid to the role of deployment on the psychological well-being of the Armed Forces.

Military deployments are often a stressful event for service members and their families. In fact, one may argue that once service members are deployed, their lives and that of their families are forever altered. Four distinct phases of deployment have been described (3-5): (1) Pre-Deployment (notification about deployment to time of departure); (2) Deployment (departure to deployed setting to return home); (3) Reunion (preparations for return home); and (4) Post-Deployment (the period after return home). Stressors related to deployment may first appear pre-deployment and persist or even exacerbate during deployment, reunion, and even the post-deployment adjustment and reintegration phase. Furthermore, the increase in operational tempo which often involves more frequent deployments, longer deployments, and possibly less time between deployments can lead to additional stress (2).

First, pre-deployment factors including one's uncertainty about what to expect during deployment, preparation for separating from primary social support network, and adjustment to increased workload and shifting duties are among some of the expected stressors. Second, during deployment, service members may become exposed to traumatic events (e.g., combat, seeing dead bodies), experience physical injuries, and/or vicariously experience home-related stressors through electronic and/or phone communications with loved ones left behind. U.S. and international research on military mental health indicates that operational and "home front" issues are both significant factors associated with stress during one's deployment (6). Third, the reunion and post-deployment phases can provide a period of relief from deployment-related stressors, yet at the same time, can serve as a period of time to reflect on one's experiences. Such reflection can result in varied outcomes and for some, may be associated with a decrease in functioning as well as an increase in psychological difficulties and possibly risk for self-directed violence including suicide. Failure to address deployment-related stressors may result in adverse outcomes related to the functioning of the individual service member, his or her family, and the military community as well as a decline in the mission-readiness of the force, and overall retention of trained military personnel. The sections below provide a summary of the existing scientific literature on the topic of deployment, mental health, and suicide.

2.0 DEPLOYMENT-RELATED FACTORS, MENTAL HEALTH, AND SUICIDE

2.1 Deployment and Mental Health

The relationship between military deployments, mental health, and suicide is complex and expected to be inter-related. Multiple pre-deployment biopsychosocial vulnerabilities can interact with experiences and stressors during deployment and post-deployment to impact a service member's psychological well-being

and functioning (7). Deployed service members are expected to be at high risk for mental health problems including posttraumatic stress disorder (PTSD; estimated as 6-20%), depression (estimated as 7%-15%), and alcohol misuse (estimated as 24-35%) (8-10). A subgroup of returning service members also report impaired quality of life (e.g., related to decreased emotional well-being, social functioning, and general health), as well as increased impulsive drinking (11). Nearly 1 in 8 individuals with a history of deployment receives at least one mental health diagnosis; 1 in 20 receives more than one (12). Recent studies of returning military personnel from deployed settings show that screening and clinician assessments identify approximately 20% of active duty and 42% of reserve component soldiers as requiring mental health treatment (13).

The highest rates of mental health diagnoses occur in females (17.4% cumulative incidence), those of “other” race/ethnicities (15.0% cumulative incidence), and among separated or divorced service members (16.2% cumulative incidence) (12). Post-deployment mental health assessments indicate that those most likely to screen positive for PTSD are those in the medical profession (54.7%), in a Reserve component (53.0%), and officers (52.9%). The least likely are those in the Air Force (36.6%) or Marine Corps (36.7%) and the youngest in age (39.6% are less than 20 years old) (12).

The number of service members reporting mental health concerns is likely to increase with time, as psychological problems have been found to increase from the time of return to several months post-deployment (14-15). Military surveillance data indicates that mental and behavioral health referrals increase in the 3-6 months following return from deployment, as do service member-reported ratings of “fair” or “poor” health (12). This increase in mental health concerns may exert a lasting effect on service members. Veterans of the 1990-1991 Persian Gulf War demonstrate significantly higher mortality rates than other Veterans who served during the same period but did not deploy (16). This excess mortality as compared to controls is also observed among Veterans of the Vietnam War (17-18).

Mental health of service members can also be related to interpersonal concerns and stressors throughout the deployment cycle. A 2008 study of OIF Veterans found that significant numbers reported post-deployment concerns about social support. Service members reported that they did not feel that family and friends provided the emotional or instrumental support they needed (19). Other studies have found that families report financial difficulties (20), spousal arguments, (20), physical aggression and abuse of a spouse (20-21), and child abuse (20, 22) following a military deployment. One study of positive and negative consequences of military deployment did allow participants to write-in comments regarding their deployment experiences (23). Among 951 deployed Army soldiers serving in Bosnia, being “away from family/missed important events” and “deterioration of marital/significant other relationship” were the second and third most frequently reported negative psychological consequences of deployment.

2.2 Duration/Location of Deployment and Mental Health

Military personnel report increased levels of distress (24) as deployments progress. In addition, a greater number of psychiatric and physical health symptoms are reported following long deployments as compared to shorter ones (25). As the duration of a deployment increases, so does the rate of adverse stress reactions (26). For example, PTSD symptoms appear to be more prevalent among service members with deployment durations longer than four months (27). This effect may be moderated by gender; a recent study found that deployment length was related to increases in depression and PTSD in male soldiers but not in female soldiers (28). Further, recent surveys of OEF/OIF Veterans indicate that duty in Iraq is associated with higher incidences of positive screenings for depression, generalized anxiety, and PTSD than is duty in Afghanistan (14). These findings may be associated with the types and severities of stressors that a service member experiences within a specific deployment location – such as traumatic exposure described below.

2.3 Types of Traumatic Exposure during Deployment and Mental Health

Deployed service members are at risk for multiple forms of injury and illness, including non-combat related sickness as well as combat-related injuries. Troops in Afghanistan and Iraq frequently report diarrhea (54.4% in Afghanistan and 76.8% in Iraq), respiratory illness (69.1%), non-combat injuries (34.7%), and leishmaniasis (2.1%) (30). Studies indicate that medical evacuations for such non-combat illnesses and injuries are 3-6 times more likely than evacuation for combat-related wounds (31).

Despite the prevalence of non-combat injury and illness, combat deployments also increase the likelihood of exposure to physical injury. Of all service members screened for injury due to blast exposures, motor vehicle accidents, falls, or gunshot wounds to the head or neck area, 59% are eventually diagnosed with some form of Traumatic Brain Injury (TBI) (31-32). Military surveillance data (12) indicates that TBI-related hospitalizations due to “battle casualties” increased following September 11th. From January of 2003 to December of 2007, the Defense and Veterans Brain Injury Center has seen 5,263 service members for evaluation and management of TBI (33). Overall, 22% of all wounded returnees from the OEF/OIF theaters of operation demonstrate some form of TBI (31-32). Among soldiers diagnosed with mild TBI, poor general health, missed workdays, medical visits, and somatic and post-concussive symptoms are more common than among soldiers reporting other physical injuries (34). Individuals with TBI may also be at an increased risk for PTSD and other anxiety disorders if damage to the prefrontal cortex results in the disruption of neural networks involved in the regulation of anxiety (35).

Perhaps, the most significant exposure during deployment in relation to psychological well-being is related to participation in combat operations (7). A 2008 study of 50,184 service members found that those who reported any form of combat exposure demonstrated significantly higher odds of reporting post-deployment PTSD symptoms than did those who did not deploy. Traditionally, being fired on and/or witnessing the injury or death of others has been the focus of studies regarding traumatic stress reactions (36-38). Service members report greater psychiatric symptomatology following specific military-related combat duties such as handling human remains (7, 39-40). Findings regarding the impact of specific military duties on mental health generally seem related to an individual’s exposure to atrocity or extreme violence (41-42) during the deployment.

However, there is growing evidence that exposure to trauma or atrocity may not sufficiently account for the development of post-traumatic psychopathology and psychosocial concerns following return from deployment (42-44). Pre-trauma risk and protective factors appear to play an important role in the way stressful experiences differentially impact individuals. In a meta-analysis of 85 data sets from studies examining PTSD, the following variables were found to enhance the risk of mental health problems following traumatic exposure: female gender, social, educational, and intellectual disadvantages, psychiatric history, and a history of previous abuse, trauma, or childhood adversity (42). Concerns regarding family members or interpersonal relationships that exist prior to traumatic exposure have also been shown to increase individual risk for developing mental health concerns (40, 45). Finally, studies of trauma survivors demonstrate that previous exposure to trauma is associated with greater distress following a subsequent trauma (42, 46-47).

2.4 Deployment, Suicide Ideation, and Suicide-Related Behaviors

Suicide has historically ranked as the second leading cause of death after accidents in the U.S. Armed Forces (48). The average suicide rate for the Department of Defense (DoD) in 2008 has been estimated at 15.5 per 100,000 (49). While the relationship between deployment and suicide is not yet clearly understood, deployment is associated with a number of significant stressors which may subsequently place service members at high risk for mental disorders mentioned in the sections above – all key risk factors for suicide. PTSD has shown the strongest association with suicide of any of the anxiety disorders. In particular, PTSD is associated with impulsive suicide attempts to a similar or greater degree than mood disorders (50). In addition, relationship problems in the military (similar to civilian populations) are a frequent precipitant for alcohol misuse – the addition of an alcohol-related disorder to an existing PTSD diagnosis results in a subsequent 6-fold increase in suicide risk (51).

In 2008, approximately 16% of military suicides occurred in Afghanistan and Iraq with the Army and the Marine Corps recording 24% and 17% of their suicides occurring in these two locations (52). Among service members who died by suicide outside of theater, almost 33% had at least one deployment and 14% had two or more deployments (52). For those without a deployment history, little is known about the proportion for whom an upcoming deployment was scheduled at the time of suicide. The number of evacuations due to psychiatric reasons (the 4th leading cause of medical evacuations) has consistently increased as well for Iraq from 5% in 2004 to 14% in 2007 and for Afghanistan from 6% in 2004 to 11% in 2007 (53).

There is no reliable data available on the rate of suicide attempts during military deployments. In the year 2006, 1.1% (n = 2411) of 222,620 soldiers and marines deployed to Iraq reported “some” suicide ideation and 0.2% (n = 467) reported “a lot” of suicide ideation on their Post-Deployment Health Assessment (8). In one of the only recent studies (54) on suicidal service members in deployed environments, 30% of service members treated for mental health reasons in Iraq were found to have experienced thoughts of ending their lives within the past week. Nineteen percent had a specific suicide plan, and 6% had acted in a suicidal manner (e.g., placing a weapon to their head). Moreover, not much is known about how decisions about whether or not to medically evacuate suicidal service members from deployed settings are formally made. A recent review (53) of 1264 consecutive medical evacuations for psychiatric reasons, from Iraq and Afghanistan, conducted between 2001 and 2004, indicates psychiatric evacuees were more likely to be evacuated within the first 6 months of their service (80%), to be female, younger than 31 years old, African-American or Hispanic, enlisted and National Guard/Reserve. The most common psychiatric diagnosis was adjustment disorder (37.6%) (53). Almost 5% of service members who were evacuated for psychiatric reasons were returned to deployed settings.

The increased risk for suicide may be associated with specific deployment-related factors such as length of deployment, location of deployment, number of deployments, exposure to injury, illness, and traumatic events during deployment, perceived threat, problem solving and coping skills, and/or interpersonal problems initiated or exacerbated during the time of deployment. Furthermore, once a person returns from a deployment, there may be a sensitive period during which time the person is at the highest level of risk for suicide. Risk may be associated with post-deployment adjustment-related factors such as the onset or the worsening of psychiatric symptomatology, medical injuries and/or pain, changes in one’s schema of self, moral injury, guilt, and/or shame, continued exacerbation of interpersonal problems, and actual or perceived lack of social support.

Furthermore, situational factors such as availability of firearms at home and/or perceived barriers to care and stigma may exacerbate suicide risk. The most recent Mental Health Advisory Team 6 (MHAT 6) (55)

findings on OEF/OIF suggest that unit barriers to care and stigma are found to be higher than rates reported in previous MHATs and surprisingly despite DoD anti-stigma campaigns, stigma rates are on the rise. Without adequate treatment, suicide-related ideation and behaviors may result in costly utilization of social services, human suffering, and eventual death. The Department of Veterans Affairs (VA) reports that Veterans (i.e., males with high-risk psychiatric diagnoses, chronic physical illness, poor social support, and firearm availability) as compared to the general U.S. population are at greater risk for suicide by almost 23% (56). According to the National Violent Death Reporting System (57), 20% of U.S. suicide deaths could be among Veterans with an estimated 5 suicides and 1000 suicide attempts daily among those receiving care in the Veterans Health Administration (57).

A review of over 10,000 records of U.S. military Veterans treated from 1993 to 1998 for a suicide attempt indicates that eventual death by suicide is the 2nd (i.e., after heart disease) leading cause of death in males and the 1st leading cause of death in females (58). Another recent study (59) indicates that vulnerable groups may include those OEF/OIF Veterans with active duty service and those with a diagnosed psychiatric disorder. In a study (60) that examined the suicide behavior of 100 Vietnam combat Veterans with PTSD, 34% were suicidal – 19% had made a suicide attempt following their service and 15% experienced chronic preoccupation with suicide. Guilt is considered a potential mechanism that explains the relationship between combat trauma and suicide-related behaviors. Suicidal Veterans report significantly higher levels of persistent guilt following traumatic exposure (60). For instance, a Veteran may think that the self-inflicted injury is well-deserved and use it as a method of self punishment for emotions, cognitions, and behaviors demonstrated during combat (61). In other Veterans, suicide-related behaviors may indicate poor problem solving and ineffective coping strategy for dealing with “legal” combat experiences and those that may be perceived as atrocities either witnessed or committed (62). Suicide-related behaviors for traumatized individuals may particularly occur during periods of flashbacks or dissociation (62).

Moreover, interpersonal and family concerns may place service members at increased risk for self-harm as financial problems, relationship difficulties, and social isolation have all been identified as risk factors for suicide (63-64). A recent study addressing both interpersonal concerns and suicide ideation among 1,195 deployed OEF/OIF Navy personnel found that as many as 27% of service members reported “stressors in the family that could negatively affect the service member” and such noted stressors were associated with incidence of suicide ideation and/or attempts in 3% to 4% of the sample. Additionally, among those who reported instances of suicide ideation and/or attempts, 27% reported multiple instances (65).

Finally, the risk of suicide in those with physical injury and chronic pain is approximately double that of the general population, with suicide attempts ranging from 5-14% in some populations (66). Among injured and chronic pain populations, variables such as dimensions of pain (frequency, duration, and intensity), insomnia, helplessness, and hopelessness serve as important risk factors for suicide events (66). Individuals with concussion, cranial fracture, or cerebral contusion and hemorrhage have also been shown to be at increased risk for suicide-related behaviors in relation to the general public (67). Chronic pain, auditory and other sensory dysfunction, sexual changes, and changes in body image can also appear following brain injuries which may all be associated with an increased risk for suicide-related ideation and behaviors (33).

3.0 CURRENT EFFORTS TO ADDRESS DEPLOYMENT-RELATED RISK FACTORS FOR MENTAL HEALTH PROBLEMS AND SUICIDE

A number of DoD and service specific psycho-educational programs have been launched in the U.S. to address deployment-related risk factors for mental health problems and suicide. For instance, training programs such as “Battlemind Training” (68), are designed to help service members gain knowledge on the

psychological reactions to various phases of the deployment cycle and develop skills necessary for establishing and maintaining psychological well-being during and after deployment. The effectiveness of Battlemind Training has been established (69). However, many countries other than the U.S. do not offer their military units stress management prevention trainings pre-deployment (69). Furthermore, many of the existing U.S. and international psycho-educational programs designed to prevent deployment-related adverse outcomes lack scientific evidence for efficacy (70).

The health and wellness needs of military personnel are predominantly addressed by the Military Health Services System (MHSS). In the U.S. alone, the MHSS operates 117 military hospitals and 400 military clinics. Recent reviews have generated some concern about the provision of care by the MHSS. In an analysis of the military health system and its ability to address increases in the need for mental health care services, the American Psychological Association's Military Deployment Services Task Force formed in 2007 (2) identified three main barriers to care. These included the process of receiving referrals, difficulties in scheduling appointments, and the stigma associated with receiving care. The stigma item in particular has been the focus of much attention by military behavioral health researchers. Soldiers and Marines frequently report concerns about being stigmatized for seeking mental health services (8); more alarmingly, those who screen positive for a mental disorder are almost twice as likely to report stigma concerns as those who do not screen positive. Among those who screen positive, only 38 to 45 percent indicate that they would be interested in receiving helping services.

The recommendations of the Defense Health Board's Task Force on the Prevention of Suicide by the Members of the Armed Forces (49) address these and other concerns by proposing specific changes in the military health care system. These changes include building a culture of support for psychological health by dispelling stigma, making professionals more accessible, and making assessment procedures an effective, efficient, and normal part of military life; ensuring a full continuum of care through prevention, early intervention, and treatment; and providing sufficient resources through the allocation of staff and the use of healthcare networks. Several established assessment and referral systems already in place address these recommendations.

Once adequate and evidence-based health services have been obtained by a service member, continuity of care throughout the deployment cycle is extremely important. Programs such as the Operational Stress Control and Readiness (OSCAR) which embed behavioral health providers with units throughout the deployment cycle need further evaluation and possible wider dissemination across all military units. Furthermore, military leaders can play an important role in moderating the possible deleterious effects of deployment on service members' psychological well-being and therefore, should be considered an important asset in prevention efforts. For example, service members demonstrate positive outcomes following deployment if they believe that senior leadership gained their confidence, clearly articulated goals, provided adequate structure, and acknowledged their sacrifices (69).

In addition to psycho-educational programs, adequate and evidence-based health services delivery, and continuity of care, population based assessment strategies for post-deployment reactions may prove to be incredibly helpful in overall prevention efforts. As part of its Force Health Protection program, the U.S. military, as mandated by the Assistant Secretary of Defense for Health Affairs (DoD Instruction 6490.03), requires deployment-related health assessments of all service members including Active Duty, National Guard, and Reserve members. Assessments are also offered to members that have separated or retired since returning from deployment (Deployment Health Clinical Center). These assessments include the Pre-Deployment Health Assessment (PDHA; DD Form 2795), the Post-Deployment Health Assessment (DD Form 2796), and the Post-Deployment Health Re-Assessment (PDHRA; DD Form 2900). Service members

are contacted by their unit leaders and provided with information on how to access their service-specific electronic or web-enabled version when they fall within the timeframe for completing the PDHRA. After service members have completed the form, they meet with a healthcare provider to discuss any concerns they have endorsed and receive referrals if further evaluation or treatment is warranted. The data is sent electronically to the Armed Forces Health Surveillance Center for inclusion in the Defense Medical Surveillance System. These deployment-related assessment tools collect information on stressful life events and resultant mental health concerns, interpersonal difficulties, suicide ideation as well individual factors and behaviors which may serve a protective function.

Finally, research efforts in the areas of surveillance, epidemiology, and treatment efficacy/effectiveness are continually evolving. Currently, DoD efforts are underway to develop a better understanding of military-specific risk and resilience factors (Army Study to Assess Risk and Resilience in Servicemembers [STARRS]) that are associated with suicide. Moreover, the first author of this manuscript is currently evaluating the efficacy of a brief inpatient intervention, titled, Post Admission Cognitive Therapy (PACT) for the treatment of suicidal service members (with and without a history of combat-related trauma) who are psychiatrically hospitalized for inpatient care. Regardless of the progress made, more research with practical applications is much needed. A recent Task Force on Military Deployment Services for Youth, Families and Service Members, established by the American Psychological Association (2) has noted a lack of “comprehensive, system-wide research efforts” to address the psychological well-being of service members and their specific service needs during and following deployments. More specifically, the Task Force highlights the sparse knowledge base in relation to unique populations including female service members, National Guard and reservist members, and minorities.

4.0 SUMMARY

The United States Department of Defense, the American Psychological Association (2), the Defense Health Board Task Force on the Prevention of Suicide by Members of the Armed Forces (49), and the RAND Corporation (26) are all in agreement that more needs to be done to better understand the association between deployment-related factors, mental health problems, and suicide. In this paper, a review of the scientific literature pertaining to deployment-related factors that have been associated with risk for mental health problems and suicide has been presented. Service members and their families can benefit from this information by gaining a better understanding of the common deployment-related stressors which may precipitate mental health problems and suicide risk. Primary care and specialty care providers, chaplains, and other helping professionals who serve military populations can benefit from this information by being reminded to routinely assess for deployment-related experiences and perceived stressors. Researchers are encouraged to further explore the possible association between deployment, mental health, and suicide – as well as examine the possible mediators and moderators for such associations. Finally, given that the vast majority of research on the topics of deployment, mental health, and suicide is generated by investigators in the U.S., the applicability of findings to other nations, their military organization, and culture remains unknown. The current North Atlantic Treaty Organization (NATO) Human Factors and Medicine Panel Symposium on Mental Health and Well-Being across the Spectrum is an important and effective mechanism for communicating and sharing knowledge among countries for the ultimate purpose of maximizing psychological well-being among military personnel of all nations who dutifully serve their countries.

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